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GROWTH IN DEMAND FOR FEED GRAINS IN THE EEC

PROJECTION TO 1970 AND 1975

IN RELATION TO CONSUMPTION

OF MEAT AND LIVESTOCK PRODUCTS

PREFACE

The author wishes to express his appreciation to the Agricultural Attachés with the American Embassies in the countries of the European Economic Community and with the U.S. Mission to the European Communities:

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Where possible, physical measurements have been kept in the metric system. Thus wherever "tons" are referred to, "metric tons" are meant. It has been necessary to use annual data in which the period of 1 year may be measured in different ways. In this study, an unqualified date (e.g., 1960) means a calendar year. Two such dates joined by a hyphen (e.g., 1960-61 or 1960-65), mean two or more calendar years. A slash (/) indicates a crop year. For example, 1964/65 means "the crop year beginning July 1, 1964 and ending June 30, 1965."

All money values were converted to U.S. dollars.

July 1967

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⑦ Milk

ONE KILOGRAM OF PRODUCT

U. S. DEPARTMENT OF AGRICULTURE   NEG. ERS 5112-67 (5)   ECONOMIC RESEARCH SERVICE

EEC AND U.S. FEEDING RATES
KILOGRAMS OF GRAIN FED

EEC | U.S.

① Pork
② Eggs
③ Poultry
④ Beef (Grain fattened)
⑤ Beef (All)
⑥ Minor meat
⑦ Milk

ONE KILOGRAM OF PRODUCT

U. S. DEPARTMENT OF AGRICULTURE   NEG. ERS 5111-67 (5)   ECONOMIC RESEARCH SERVICE

SUMMARY

Feed grain consumption in the EEC is expected to reach 48.6 million tons in 1970 and 58.4 million tons in 1975, provided that-

- the demand for meat develops as projected in this study,
- the EEC maintains the degree of self-sufficiency in the basic categories of meat experienced from 1962 to 1964 and becomes self-sufficient in poultry, and
- the feeding rates involving grain for all livestock products except poultry and eggs continue to change as they appear to have done for the past 15 years.

These figures are 39 and 67 percent higher than the 1961/62-1962/63 average of 34.9 million tons or 18 and 45 percent higher than the 1965/66 figure of 39.8 million tons. Consumption has risen in spurts, but without a setback, from 19.1 million tons annually in 1950/51-1952/53 to 34.9 million tons annually in 1961/62-1962/63.

Although it is impractical to evaluate future trade in feed grains, the United States has found a large market for feed grains in the EEC since its inception. Of $1.5 million worth of agricultural products exported to the EEC in 1965/66, feed grains accounted for one-third, and total grain exports increased 66 percent over the preceding 8 years.

In 1970, livestock are expected to consume nearly 32 million tons of grain. Of this, 21 million tons of feed grains appear destined for pork, over 5 million for poultry, and nearly 5 million for beef. Milk and egg production can be expected to absorb nearly 9 and 8 million tons of grain, respectively.

In 1975, meat production is expected to absorb over 38 million tons of grain: 25 million for pork, over 8 million for poultry, and almost 6 million for beef. Milk and egg production is likely to account for about 19 million tons of grain.

Unless domestic production of grain increases more rapidly than it has since the mid-1950's, the prospective growth in feed grain consumption is likely to widen the gap between EEC production and consumption of total grain.

Meat consumption rose from 6.3 to 10.0 million tons during 1951-53 to 1961-63 and is expected to continue to rise to 13.7 and 16.6 million tons by 1970 and 1975. It is assumed that the population will continue to grow by 1.05 percent annually, as in recent years, to 190 and 200 million in the 2 projection years. Real consumer expenditure is expected to grow from $115.4 billion in 1960 and $148 billion in 1965 to $184 and $227 billion, respectively, in 1970 and 1975. Consumer prices are likely to continue rising, and if the trend holds, the index of real meat prices received by farmers is expected to retreat slightly from 123 (1960 = 100) to 119 in 1970; this real price relationship is projected to 1975. The importance of poultry in the average EEC diet as a percentage of all meat is projected to grow at the expense of all other meats except beef.

GROWTH IN DEMAND FOR
FEED GRAINS IN THE EEC

Projection to 1970 and 1975 in Relation to Consumption of .
Meat and Livestock Products

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INTRODUCTION

The European Economic Community is the largest single outlet for commercial exports of U.S. farm products. In recent years, the Community has purchased annually over a billion dollars worth of farm products from the United States, and feed grains have been a large and growing part of this trade. In 1965/66, the United States sold $537 million of feed grains to the EEC out of total U.S. agricultural exports to the EEC valued at $1,593 million. This movement of feed grains from the United States to the EEC is a fundamental part of the favorable trade position of the United States with the Common Market and an important positive contribution to the U.S. balance of payments. Exporters in the United States have a direct interest in knowing which factors affect EEC imports of such large quantities of feed grains.

In volume, gross grain imports of the EEC increased in 8 years by 34 percent, while grain imports from the United States increased by 66 percent. Coarse grain imports from the United States increased two and a half times. Between the 3-year periods 1955/56-57/58 and 1962/63-64/65, gross grain imports by the EEC rose from 11.9 million tons a year to 16.0 million tons (fig. 1). In this period, grain imports from the United States rose from 4.2 million to an estimated 7.0 million tons, while coarse grain imports, also from the United States, surged from 2.4 to 6.25 million tons.

Underlying this import demand for grains is a rapid growth in grain consumption which EEC domestic production has not quite matched. While all other uses of grain accounted for slightly over 29 million tons annually throughout the period, the feed use of grain has risen from 28.0 million tons to 37.4 million tons annually-- an increase of 34 percent. Total annual grain consumption rose from 57.2 to 66.9 million tons, up 9.7 million tons--17 percent, in 8 years. Total grain production has risen from 48.6 to 58.0 million tons, a 9.4 million ton rise, representing a 19 percent increase (fig. 2).

The pinch is tighter when attention is focused on coarse grains. In the 8-year period used above, total production of coarse grains increased by 4.3 million tons to 30.3 million, while feed use of these grains increased 7.4 million tons to 32.4 million. Under these circumstances, more wheat was fed to livestock and imports of coarse grains increased sharply.

EEC: GRAIN IMPORTS
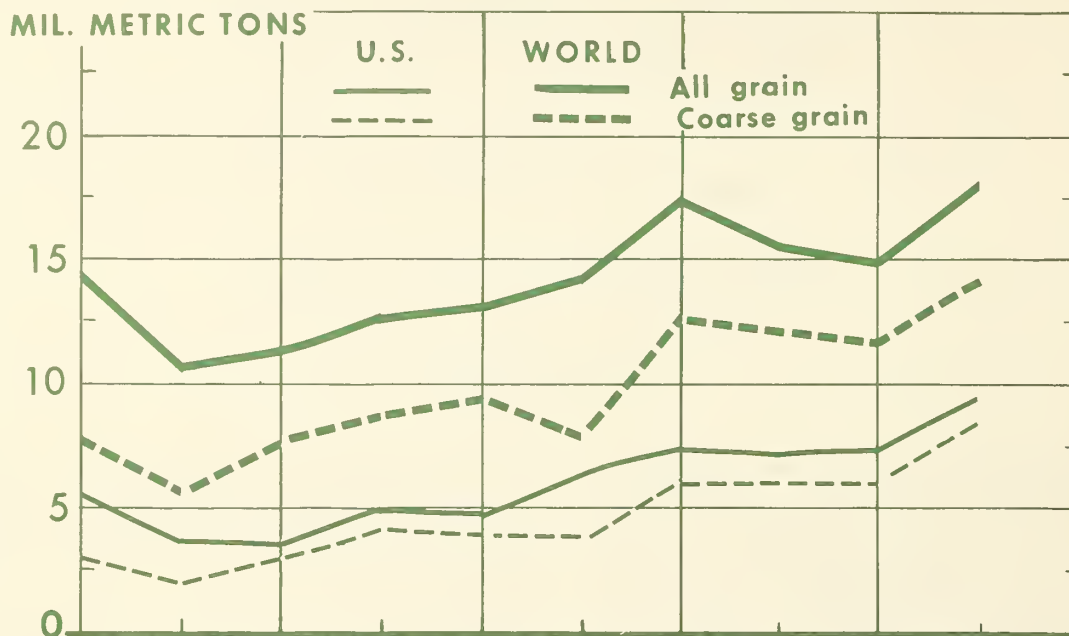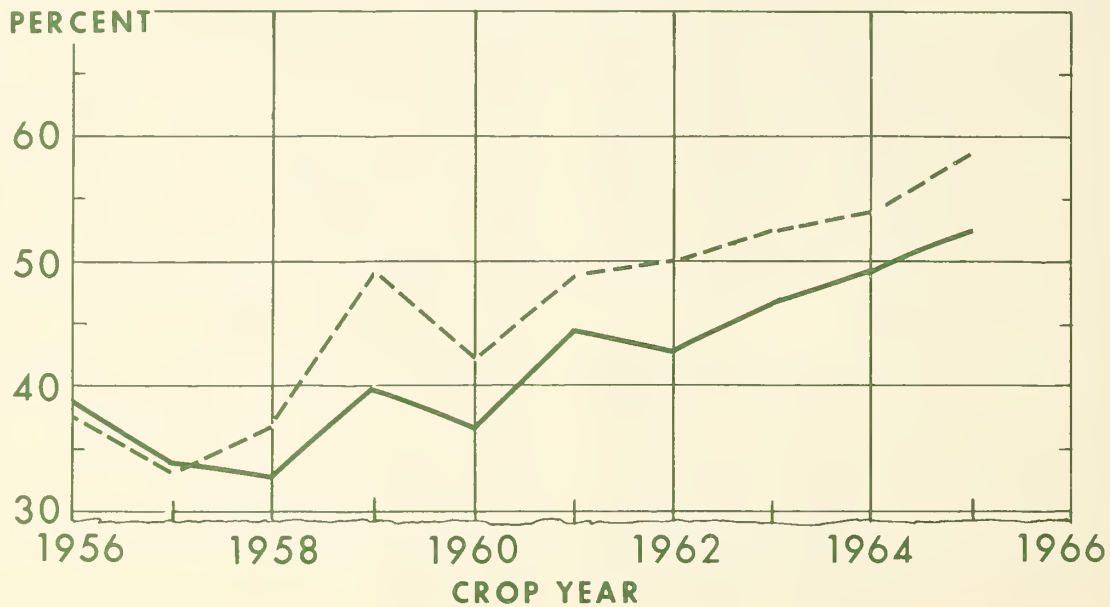
VOLUME

Figure 1

EEC: GRAIN PRODUCTION, CONSUMPTION, AND TRADE

ALL GRAIN

MIL. METRIC TONS

Consumption

Production

Grain fed to livestock

Gross imports

Net imports

Gross imports from U.S.

60

40

20

0
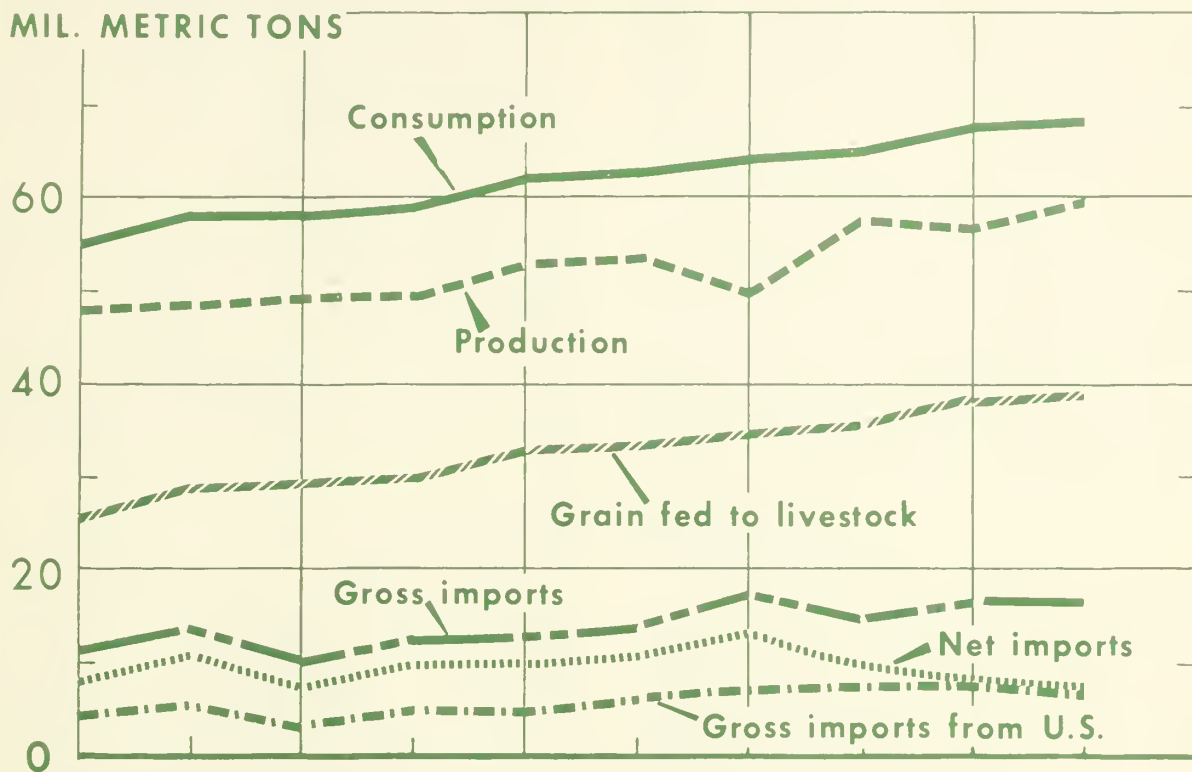
COARSE GRAIN

MIL. METRIC TONS

40

20

0

1956   1958   1960   1962   1964   1966

CROP YEAR
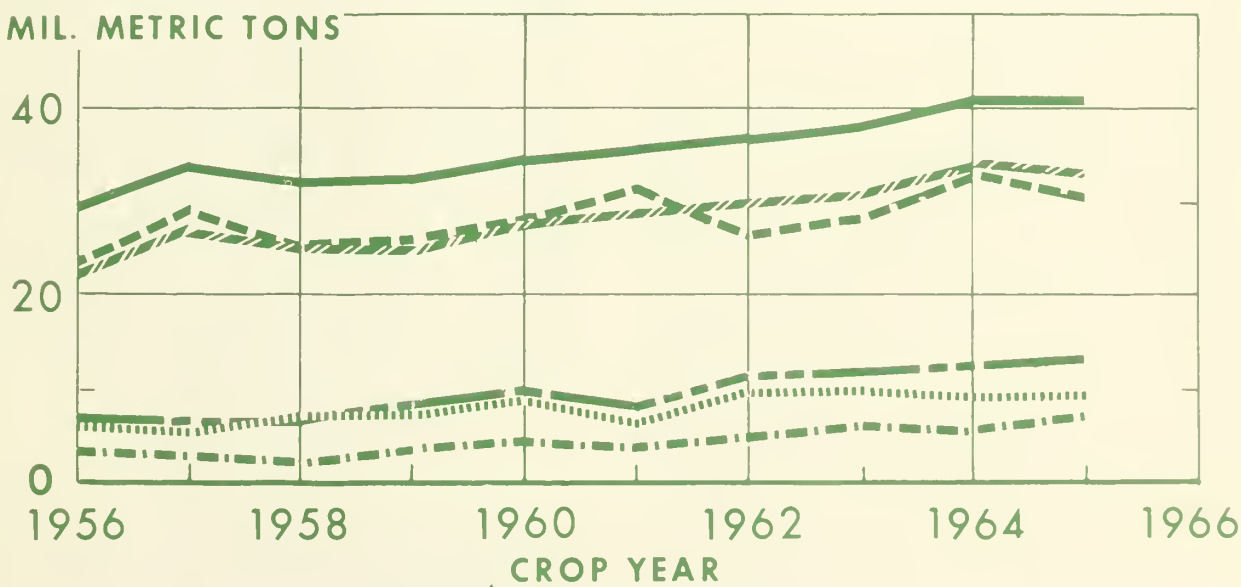
✱ *YEAR ENDING JUNE 30*

Figure 2

METHODOLOGY

In estimating demand for feed grains, this study relied heavily upon the use of feeding rates by individual classes of livestock. Because these were not readily available for the EEC from empirical study, they were developed through extensive interviewing, studying experimental information, and statistical checking of the feeding rates initially developed in carrying out the research.

The framework developed has four principal parts: (1) feeding rates, (2) consumption of livestock products, (3) livestock production, and (4) grain consumed as feed. The results of the first and third parts yield the fourth. The third part, livestock production, is related to the livestock consumption estimates.

The estimating procedures developed in this study involved the following steps:

1. Estimating current and then 1970 and 1975 feeding rates.

2. Estimating EEC total meat consumption.

3. Estimating EEC meat consumption by categories of meat.

4. Estimating EEC egg consumption.

5. Assuming degrees of self-sufficiency for each category of livestock products.

6. Estimating EEC milk production.

7. Estimating 1970 and 1975 feed grain consumption by livestock with estimated 1970 and 1975 feeding rates applied to estimated livestock production.

A basic problem was determining the proportionate amounts of feed grains fed among the different classes of livestock and poultry. The solution to this problem gave rise to estimated feeding rates for the recent past and for 1970 and 1975. Combining these estimates and livestock production estimates gave 1970 and 1975 feed grain consumption.

LIVESTOCK FEEDING RATES

EEC Livestock Feeding Practices

In the EEC countries, meat is usually produced together with other livestock products, grains, and root crops on relatively small, multiproduct farms. Feeding practices vary according to the types of animals raised, the variety and seasonal abundance of grain and root crops available locally, climate, and customs.

In parts of Germany and Belgium, the ration for dairy and beef cattle contains no grain at all. In other parts of the EEC, especially in France, beef feeding operations are in process of development--still in experimental stages. In some of these operations the rations have as heavy a grain component as rations used in the United States. Typically, however, beef and milk are joint products of a single enterprise, using unspecialized diets for the herd.

Hog feeding practices range from growing and fattening hogs entirely on roughage and root crops in parts of France and Germany to feeding heavily grain-intensive rations, as in other parts of these countries and the Netherlands. The fact that in Germany nearly two times as many potatoes are fed to hogs as are eaten by humans (15, p. 161)[1] suggests how important other feeds than grain are in European feeding practices.

Poultry production is undergoing revolutionary change. Although much of the production of poultry and eggs is a barnyard operation, a rapidly expanding segment of the broiler industry uses advanced technology comparable to that used in the most efficient U.S. broiler production. Improved feed conversion characterizes the new technology, which is based on a heavily grain-intensive pattern of production.

The increasing mechanization on farms in the EEC countries has rendered superfluous many horses, mules, and oxen, which correspondingly lowers feed consumption. The trend away from animal power is reinforced by the decline in number of farms, although there is an increase in area per farm.

EEC statistics of grain fed to livestock are not available by type of livestock, so feeding practices cannot be measured directly at national or community levels.

Estimation Procedures

The feeding rates estimated for 1961/62-1962/63 were developed by interviewing Europeans who represented a consensus of informed judgment on EEC livestock production and by studying experimental information.

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[1] Underscored numbers in parentheses refer to items in the Selected References, p. 25.

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Feeding rates were developed for individual classes of livestock and for livestock products for each of the EEC countries. For each country, the first approximations were adjusted evenly so as to account for the total estimated grain fed to livestock.

For example, the first approximations of feeding rates for Italy--expressing kilograms of grain used in producing 1 kilogram of product--were multiplied by the averages of the production estimates for Italy in 1962 and 1963 of the related livestock and livestock products, expressed in metric tons.

The first approximations of feeding rates were then adjusted so that the resulting rates, when applied to the livestock production of 1962 and 1963, just accounted for the average number of metric tons of grain fed to livestock in Italy in 1961/62-62/63. A further adjustment increased them so that the basic rates were synchronized to a calendar year basis in both livestock production and feed grain consumption.

The final rates express the 1962 rates as growing steadily with time, based on the difference between the actual quantity fed and the amount calculated with constant rates.

The Meaning and Source of Statistics

The rates shown in table 1 are average national feeding rates expressing the number of units of grain of all kinds which are incorporated into a unit of livestock product. These ratios are not grain requirements expressing all animal food as grain equivalent. Rather, they are weighted averages of national and Community composites of many breeds and qualities of livestock, together with subjective averages of many systems and styles of farming and varying climatic conditions; and they are concerned only with grain in the total ration. Grain fed includes wheat but not weed seed. Meat as referred to here is carcass weight including trim fat and offal. Milk is measured according to each country's typical grades or quality, and no adjustment is made for variation in reaching an EEC average.

The use of high protein meals as livestock feed is not part of the present study, except to the extent of taking account of the grain incorporated into such feed. For such a study, see (8).

The most recent EEC statistics were used in this study whenever available. The meat production series employed represents a gross domestic production concept

(13, 1965 (7): 92-101; 1964 (5): 52, 82) and includes meat obtained from domestic slaughter animals plus the meat equivalent of live animals exported. These figures are on a calendar year basis. The series on grain fed to livestock are official EEC data (13) from crop year 1955/56 forward, but extended backward to 1950/51, using series computed by the Netherlands Agricultural Economics Institute.[2] Thus in the feeding ratios shown in table 1, feed grain consumption is measured with a 6-month lead compared with meat production.

Feeding Rates Centered on 1962

Feeding ratios shown in table 2 incorporate an adjustment at the Community level to the rates of table 1 to synchronize grain utilization to a calendar year basis, the time unit in which meat production is measured and projected. This adjustment was made principally by increasing the rates in table 1 by 1.6 percent, representing one-half the average annual expansion in meat production from 1951 to 1964, taken as a percentage of 1962 production.

The adjustment described above results in a set of rates centered on calendar year 1962, both as to meat production and grain used as feed. Table 2 shows the results of using these rates along with average meat production in 1961-63 to estimate the average quantity of grain fed to livestock in 1961/62-62/63. The total is 34.9 million tons of grain.

Changes in the Feeding Rates

Comparison of the EEC figures of grain fed to livestock with calculations computed by applying the unadjusted rates from table 1 to livestock production shows an overestimation in the earlier years. The computed series is a calculation of the amount of grain which would have been fed to livestock if 1962/63 feeding rates had been unchanged throughout the period. The fact that the observed series has overtaken the calculated series is evidence that the amount of grain used to produce a given quantity of meat has been increasing (fig. 3a).

Table 1.--Estimated grain feeding rates, EEC, 1961/62-62/63 average

[Kilograms of grain fed during crop year per kilogram of weight of indicated livestock production[1] in ensuing calendar year]

Products	EEC	Germany	France	Italy	Netherlands	Belgium
Beef............	0.9	0.2	1.0	2.2	0.5	0.6
Veal............	0	0	0	0	0	0
Pork............	3.4	3.2	3.4	4.0	3.2	3.3
Poultry.........	2.6	2.6	2.6	2.7	2.6	2.6
Eggs............	3.1	3.1	3.2	3.2	3.0	3.0
Milk............	.11	.07	.10	.20	.12	.10
Minor meats.....	.25	.25	.25	.25	.25	.25

[1] Meat products are in carcass weight, including trim fat.
   Source: Based on interviews in the winter of 1965/66 and review of experimental results. See appendix tables 17-22 for related livestock production and grain consumption.

Table 2.--Livestock production, average feeding rates, and grain used
as feed, EEC in 1962

Products	Average livestock production, 1961-1963[1]	Average feeding rates 1962[2]	Average amount of grain fed in 1961/62-1962/63
	Mil. M.T.	Rate	Mil. M.T.
Total meat...............	10.377	(2.077)	21.549
Beef and veal................	4.210	(0.743)	3.127
Beef......................	3.467	.902	3.127
Veal......................	.743	0	0
Pork......................	4.613	3.410	15.730
Poultry...................	.977	2.607	2.547
Sub total: Major meats..	9.800	(2.184)	21.404
Minor meats..................	.577	.251	.145
Other products:			
Milk......................	65.407	.111	7.260
Eggs......................	1.957	3.109	6.084
Total: Meats and livestock products...................	--	--	34.893
Actual[3]......................	--	--	34.89

[1] See (13, 1965, No. 7, pp. 92-101). Gross domestic production on a carcass weight basis including trim fat and offal. It includes meat produced from domestic animals and also meat equivalent of animals exported live.
[2] Average feeding rates centered on 1962, kilograms of grain fed during calendar year per kilogram of indicated livestock product during the same calendar year.
[3] See (13), grain supply and distribution tables in various issues, 1959-66.

EEC: GRAIN FED TO LIVESTOCK

ACTUAL AND CALCULATED WITH CONSTANT FEEDING RATES

MIL. METRIC TONS

Ⓐ
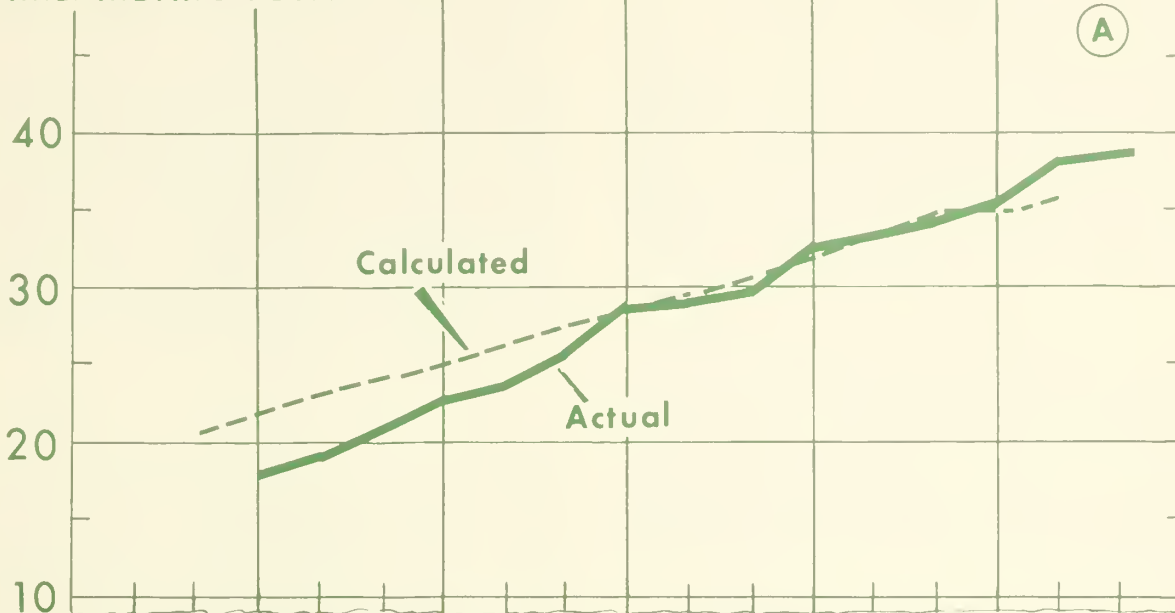
Calculated

Actual

ACTUAL AND ESTIMATED WITH CHANGING FEEDING RATES

MIL. METRIC TONS

Ⓑ

Estimated△

Actual

1948   1951   1954   1957   1960   1963   1966

CROP YEAR*
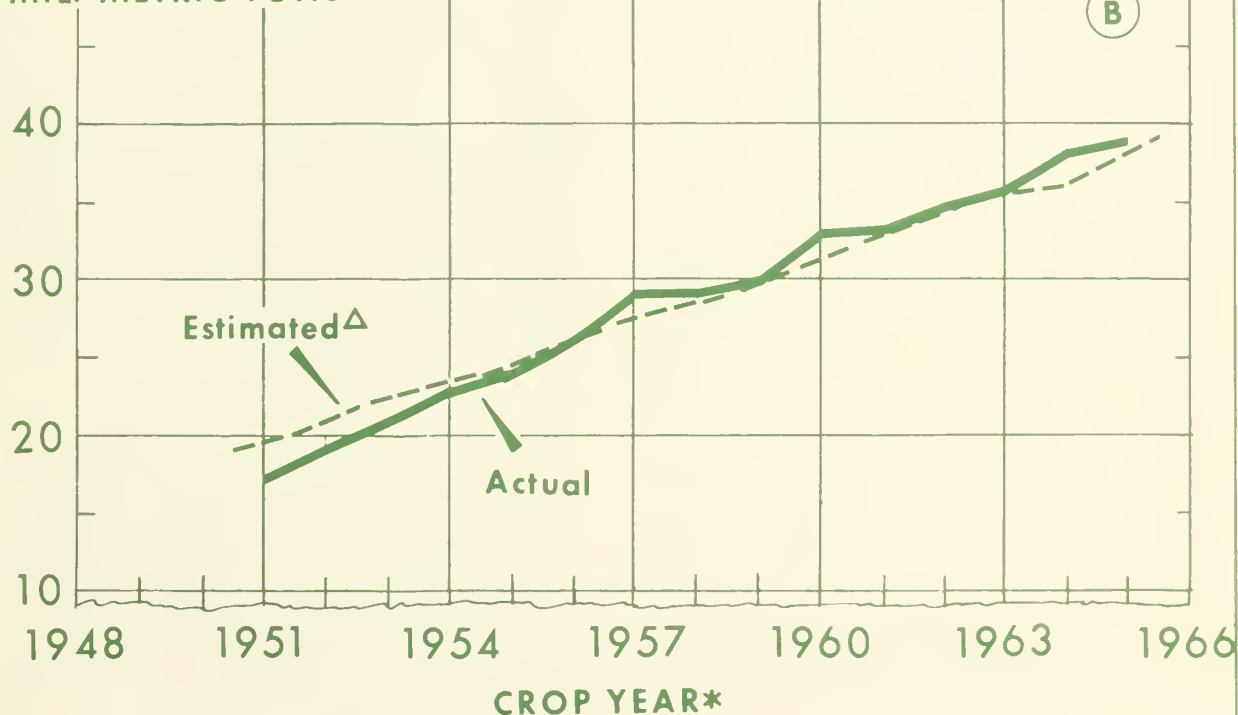
*YEAR ENDING JUNE 30.   △CALENDAR YEARS.

Figure 3

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Individual country patterns reflect the general EEC behavior. The observed series has overtaken the calculated grain use series in nearly all cases. Belgium and Germany are not clear cut, but pronounced increases in National feeding ratios have occurred in the Netherlands, France, and--most sharply--in Italy.

Yearly changes in the feeding rates for the Community as a whole were computed by measuring the rate of change implicit in the difference between time series of (1) actual amounts of grain fed to livestock as shown in EEC statistics and (2) computed amounts of grain fed to livestock based on the 1961/62-62/63 series (fig. 3 and table 3).

Table 3.--Grain fed to livestock, actual and computed, EEC, based on 1961/62-62/63 feeding rates

Year or period ending June 30	Actual	Computed	Difference
	------Million metric tons-----		
1950......	--	20.68	
1951......	17.47	[1] 21.88	-4.41
1952......	19.17	23.07	-3.90
1953......	20.77	[1] 24.00	-3.23
1954......	22.76	24.93	-2.17
1955......	23.76	[1] 26.23	-2.47
1956......	25.94	27.52	-1.58
1957......	29.04	28.67	.37
1958......	29.05	29.25	-.20
1959......	29.69	30.44	-.75
1960......	32.75	32.03	.72
1961......	33.22	33.34	-.12
1962......	34.33	34.93	-.60
1963......	35.44	34.70	.70
1964......	38.20	--	--
1965......	38.68	--	--
1952-57...	23.57	26.09	2.52
1962-63...	[2] 34.89	[2] 35.33	[2] .44
Change....	+11.32	+9.24	-2.08

[1] Linear interpolation.
[2] Difference between actual and computed due to rounding of feeding rates in adjusting.

Source: Appendix tables 17 and 23.

The amount by which the average computed quantity of grain fed exceeded the actual amount from 1951/52-56/57 to 1961/62-62/63 (8 years) decreased by 2.08 million tons. This is equal to an annual average of 0.260 million tons, which is 0.745 percent of the 1961/62-62/63 average annual quantity.

Feeding rates apparently have been increasing 0.745 percent per year in the EEC during recent years. For projection purposes, with the exception of poultry and eggs (assumed unchanging) indicated below, EEC feeding rates were assumed to continue changing at the average annual rate of 0.745 percent of the 1962 rates.

This adjustment to the basic feeding coefficients can be expressed as a function of time by the following equation:

$$C_n = C_o (1 + 0.00745\ n)$$

where--

C_o = Feeding coefficient in the base period, 1961/62-62/63.

n = The number of years from the base to the year for which the new coefficient is being estimated; 0 in 1961/62-62/63.

C_n = The new coefficient, n years from 1961/62-62/63.

Figure 3b shows actual grain fed to livestock during 1950-65 compared with estimates based on changing feeding rates. The adjusted rates are different for each year--being smaller than the 1962 rates prior to 1962, equal to them in that year, and thereafter larger than the 1962 rates. Feed grain use as estimated with the final rates agrees reasonably well with actual official EEC estimates.

Projected Feeding Rates

The evolution toward heavier grain feeding is one of many elements which are transforming agriculture in the EEC. The number of farms has been steadily declining, while average farm size has been growing at a rate which leaves total farming area hardly changed, but tending downward. Employment opportunities in cities have produced a persistent farm-to-city migration, and rural labor has become increasingly scarce. With depleted family labor supplies, the dwindling number of

small farms tends to be operated by elderly people in the traditional manner; upon their death, the land is usually combined with other holdings under more energetic, enterprising management.

With the increasing use of mechanical and electric power, crop yields have climbed and so have meat yields per animal and milk yields per cow. Root crops, difficult to harvest and cultivate mechanically, and requiring a heavy input of labor, are being replaced by grain crops. Livestock and poultry breeds have been steadily improved and husbandry practice for greater productivity have been adopted and refined. More protein-intensive feeding rations have been tried and increasingly adopted as standard practice. These underlying trends, observed during 1951-64, are expected to continue operating into the future.

Inflation has been a constant problem since World War II, and great uncertainty has characterized price expectations. From 1951 to 1964, annual EEC consumer price increases averaged more than 2.5 percent of the 1960 level. In nominal terms both grain and livestock prices received by farmers, weighted in proportion to 1960 production, rose too. Measured against prices to EEC consumers, however, real grain prices have persistently declined. Meanwhile, real livestock prices have risen and fallen in more stable fashion: however, they moved sharply upward from 1962 to 1965.

The unification of EEC target prices for grain on July 1, 1967, is expected to leave the average target price for grain in the Community near or slightly more than the 1965 average. Grain prices received by farmers in 1970 are expected to be near those of 1965. With continuing inflation, this implies a decline in the real price of grain, continuing the existing trend. For 1975, the same real grain price is expected as in 1970.

For more than 2 years farmers have been building up their cattle herds after severe depletions of 1963 and 1964. The rising domestic output of meat and a flexible policy on imports into the Community are expected to enable 1970 meat prices to remain about at their present levels and perhaps even to decline. Thereafter, however, the historically observed close tie to the level of consumer prices is likely to rule, and the real meat price for 1975 is expected to be about the same as in 1970.

In summary, meat prices are expected to rise relatively to grain prices. A price stimulus to increased grain feeding of livestock is expected to be present.

Table 4.--Estimated feeding rates, EEC, 1970 and 1975 [kilograms of grain fed per kilogram of unit livestock production]

Product	1962	1970	1975
Beef...............	0.902	0.956	0.989
Veal...............	0	0	0
Pork...............	3.410	3.613	3.740
Poultry............	2.607	2.607	2.607
Eggs...............	3.109	3.294	3.410
Milk...............	.111	.118	.122
Minor meats........	.251	.266	.275

Source: See tables 1,2, and 3 and text for methodology in developing estimates.

Applying the above factor (1 + 0.00745n) to the basic 1961/62-62/63 feeding rates of table 2 shows the estimated feeding rates for 1970 as 6 percent above the 1961/62-62/63 levels and the 1975 rates as 10 percent above (table 4). These rates, combined with projected livestock production (developed in the next two chapters), yield estimated quantities of grain consumed as feed.

Comparison with the United States

EEC and U.S. grain use by livestock is shown in table 5. The EEC figures are

Table 5.--Grain use in livestock production in the United States, 1953-55 average, and in the EEC, 1961/62-62/63 average [Grain used per 100 kilograms of livestock product, carcass weight]

Product	United States [1]	EEC [2]
	---kilograms---	
Beef and veal:		
Grain-fattened..........	761	--
All, ex. milk cows.......	264	90
Pork, incl. lard..........	629	341
Poultry [3]....................	--	261
Farm chickens............	[3] 520	--
Broilers.................	[3] 268	--
Other livestock...........	--	25
Sheep and lambs..........	208	--
Milk......................	35	11
Eggs, in shell.............	314	311

[1] Concentrates used, including grain, seed, and skim milk. Adapted from (18), table 13, p. 30. Use was made of conversion factors in (25) esp. pp. 6, 14, 15, and 16.
[2] Figures pertain to cereal grains only. See table 4 and text.
[3] Live weight.

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1961/62-62/63 averages while those for the United States are for 1953-55, more than a decade earlier. The comparison is instructive, nevertheless, since in most categories, much more grain was used by the United States then than the EEC uses now.

Only a third as much grain is used to produce a given quantity of beef in the EEC as in the United States, and less than a third as much to produce milk. Pork is produced in the EEC with little more than half the grain used in the United States. Only the feeding rates for poultry and eggs are roughly comparable.

The feeding rates projected for the EEC in 1975 would bring feed use of grain in the Community only marginally closer to the intensity with which grain was used in the United States nearly 15 years ago.

THE DEMAND FOR MEAT

Background

Meat consumption in the EEC rose from 6.25 to 9.95 million tons from 1951-53 to 1961-63--almost 60 percent. Population grew 9 percent during this period and per capita consumption of meat increased 46 percent. Higher rates of per capita consumption accounted for 84 percent of the total increase in meat consumption (table 6).

Per Capita Meat Consumption

Projected estimates of meat consumption in the EEC for 1970 and 1975 were made by relating per capita meat consumption, by the following multiple regression equations, to real per capita consumer expenditure of the Community and to the real price of meat received by farmers from 1951 to 1963:

$$Cm = -0.222\,Pm + 0.829\,E + 38.979 \qquad R^2 = 0.997 \quad (1)$$
$$(0.107) \qquad (0.032) \qquad\qquad S^2 = 0.834$$
$$DW = 1.812$$

$$Cm = -0.204\,Pm + 0.657\,E + 0.677\,T + 47.870 \qquad (2)$$
$$(0.108) \qquad (0.173) \qquad (0.671) \quad R^2 = 0.997$$
$$S^2 = 0.833$$
$$DW = 1.519$$

$$Cm = -0.277\,Pm + 0.734\,E + 1.648\,D + 51.251 \qquad (3)$$
$$(0.085) \qquad (0.042) \qquad (0.599) \quad R^2 = 0.998$$
$$S^2 = 0.648$$
$$DW = 1.876$$

where--

Cm = Index of per capita consumption of all meat (base 1960: 52.63 kilograms = 100) (Carcass weight excluding trim fat).

Pm = Index of price of meat received by farmers (base 1960 = 100) deflated by index of consumer prices (base 1960 = 100)

E = Index of real per capita consumer expenditure (base 1960: $672 equiv. = 100)

N = Index of population (base 1960: 171.7 million = 100)

T = Time (0 in 1950)

D = A variable bearing the values 0 in 1951 through 1953, 1 in 1954 through 1958, and 2 in 1959 through 1964.

The regression coefficients are estimators of the price and expenditure (income) elasticities in 1960, the base of the index numbers used. As expenditure rises, the expenditure elasticity, as estimated by these functions, declines. The price relationship is appropriately negative.

Of these three relationships, equation (1) was used for the projections because of its essential simplicity, and because the incorporation of additional variables added little to the closeness of the fit while increasing the complexity of projection. Equation (2) was not employed because of the

Table 6.--Meat consumption, EEC, 1951-53-61-63

Period and change	Meat consumption		Popu-lation
	Total	Per capita	
	Mil. M.T.	Kg.	Mil.
Averages:			
1951-53........	6.25	39	160
1961-63........	9.95	57	185
Increase........	3.70	18	15
	----------Pct.----------		
Percentage change	(59%)	(46%)	(9%)

Source: (24).

questionable significance of the time variable, the weakened influence of the price variable, and the introduction of a higher degree of serial correlation. Equation (3), probably the best equation of the three for analytical description of the recent past, shows the strongest influence of price. But the D variable is difficult to extrapolate. Figure 4 shows actual per capita meat consumption from 1951 to 1963 in the EEC and the estimates obtained with equation (1).

Projection of Total Meat Consumption

Population, which was 171.7 million in 1960 and 181.5 million in 1965, is expected to be 190 million in 1970 and 200 million in 1975. In recent years, population growth in the EEC has averaged 1.05 percent

EEC: PER CAPITA MEAT CONSUMPTION

% OF 1960

EQUATION 1

$C_m = -0.222\ P_m + 0.829E + 38.979$
(0.107)   (0.032)

$R^2 = 0.997$ $S^2 = 0.8$ DW = 1.812

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Figure 4

11
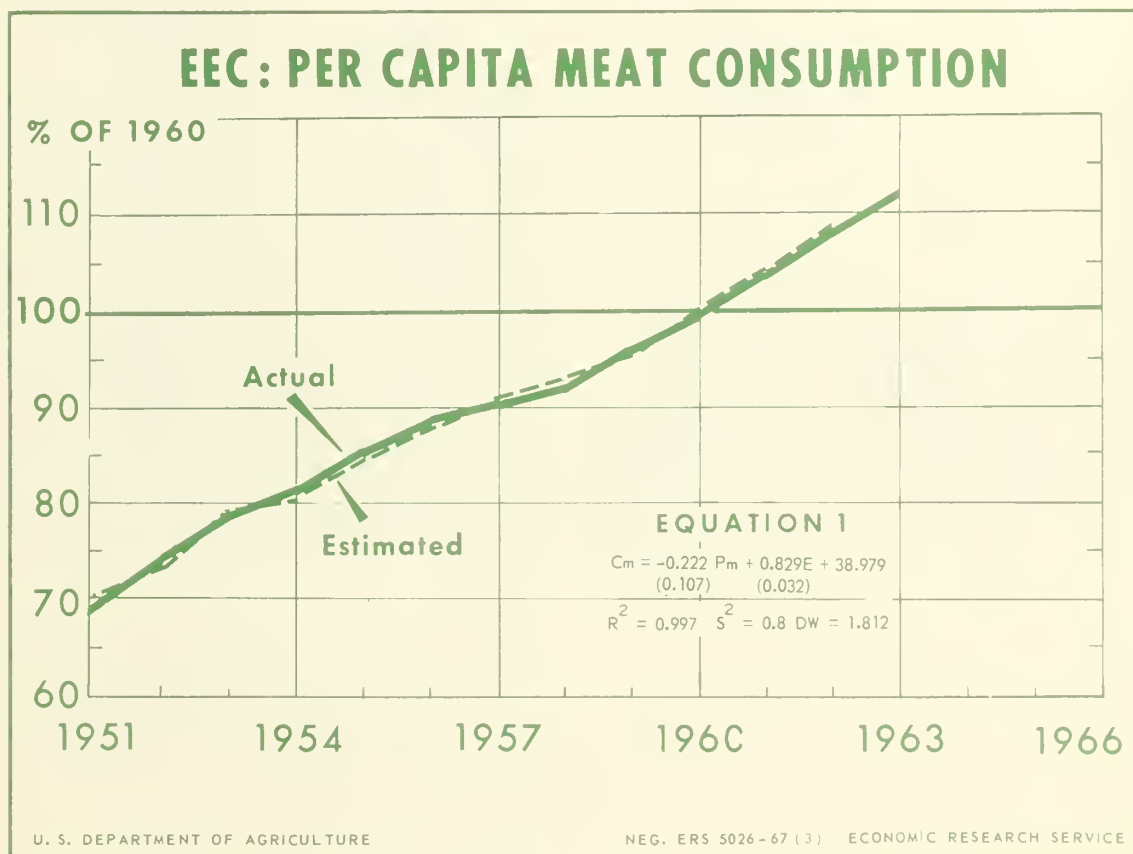
Table 7.--Meat consumption and EEC, related economic conditions, 1960 and
1965, and projected 1970 and 1975

Item	Unit	1960	1965	1970	1975
Meat consumption: [4]					
Per capita.................	Kg.	52.6	62.3	71.9	83.0
Total......................	Mil. M.T.	9.04	11.3	13.7	16.6
Population[1].................	Mil.	171.7	181.5	190.0	200.0
Real consumer expenditure:[1]..	Bil. 1960 dol.				
Total......................	equiv.	115.4	148.3	184.0	227.0
Per capita.................	1960 dol. equiv.	672.0	818.0	963.0	1,133.0
Consumer prices[1].............	Index	100.0	116.0	126.0	(140.0)
Meat prices received by farmers[2]....................	Index	100.0	[3] 115.6	119.0	(133.0)
Real meat prices received by farmers[2]....................	Index	100.0	[4] 99.9	95.0	95.0

[1] Appendix table 29.
[2] Appendix table 30.
[3] 1964.
[4] Appendix table 30. Excluding trim fat; including offal.

annually, and this rate is expected to con-
tinue through 1975 (table 7).

Real consumer expenditure was equiva-
lent to $115.4 billion in 1960 and $148 bil-
lion (1960 dollars) in 1965. It is expected
to grow at an annual rate of 4.33 percent,
to $184 billion in 1970 and $227 billion in
1975 (always in 1960 dollars). Growth of
income from 1965 to 1975 is expected,
under the 4.33 percent annual growth as-
sumption, to be somewhat less rapid than
it has been during the past decade.

These population and consumer expendi-
ture estimates imply that real per capita
consumer expenditure was equivalent to
$672 in 1960 and $818 in 1965, and will
expand to $963 in 1970 and $1,133 in 1975.

If consumer prices rise from 116 in
1965 (index 100 in 1960) with the 1951-64
trend,[3] they may be expected to rise to
126 in 1970 and to 140 in 1975.

The prices of meat received by farmers
were measured in terms of an index of
livestock prices for the different types of

[3] A linear arithmetic trend fitted to 1951-64 data.

animals produced in the countries of the
EEC(6) weighted by the quantity of each
type produced in each country. This index,
deflated by the consumer price index, is a
basic variable in the regression equation
for the per capita demand for meat. The
undeflated index stood at 122.9 in 1965
(1960 = 100) and has been estimated, by
studying influences acting on the individual
prices, as likely to retreat slightly to 119
in 1970 as growth in meat production re-
sumes after the 1962-64 plateau. Given the
sharper rise expected in consumer prices
generally, 119 for the index of meat prices
received by farmers implies a decline of
the index of the real meat price to about 95
in 1970; the same real meat price is ex-
pected for 1975.

The foregoing projections, interpreted
through equation (1), yield projected per
capita meat consumption of 71.8 and
83.0 kilograms in 1970 and 1975, re-
spectively. In turn, these results imply
total meat consumption of 13.7 and
16.6 million tons in the same years
(table 7).

Consumption by Meat Categories

Additional regression equations, to express per capita consumption of each type of meat as a function of the prices of the different types and of real per capita consumption expenditure, would have been desirable. However, import and export data by commodities are not available prior to 1956 for all the EEC countries in sufficient detail to permit computing the derived consumption by the individual types of meat. The few annual observations since then were not considered sufficient to permit reliable measurement of the many coefficients involved.

The simpler alternative method was employed of extrapolating least squares straight trend lines of the percentage distribution of per capita meat consumption by type of meat, fitted to data from 1955/56 to 1963/64.

This projection shows a number of possible shifts in the future meat consumption pattern of the EEC. Beef is expected to take an increasing share of total meat consumption and poultry is likely to continue its surge into major prominence. Pork is likely to be the main loser from these gains, but veal and other meats are also expected to lose relative importance (fig. 5 and table 8).

The projected consumption patterns, applied to projected per capita and total meat consumption, yield estimates of 1970 and 1975 meat consumption by types of meat (table 9).
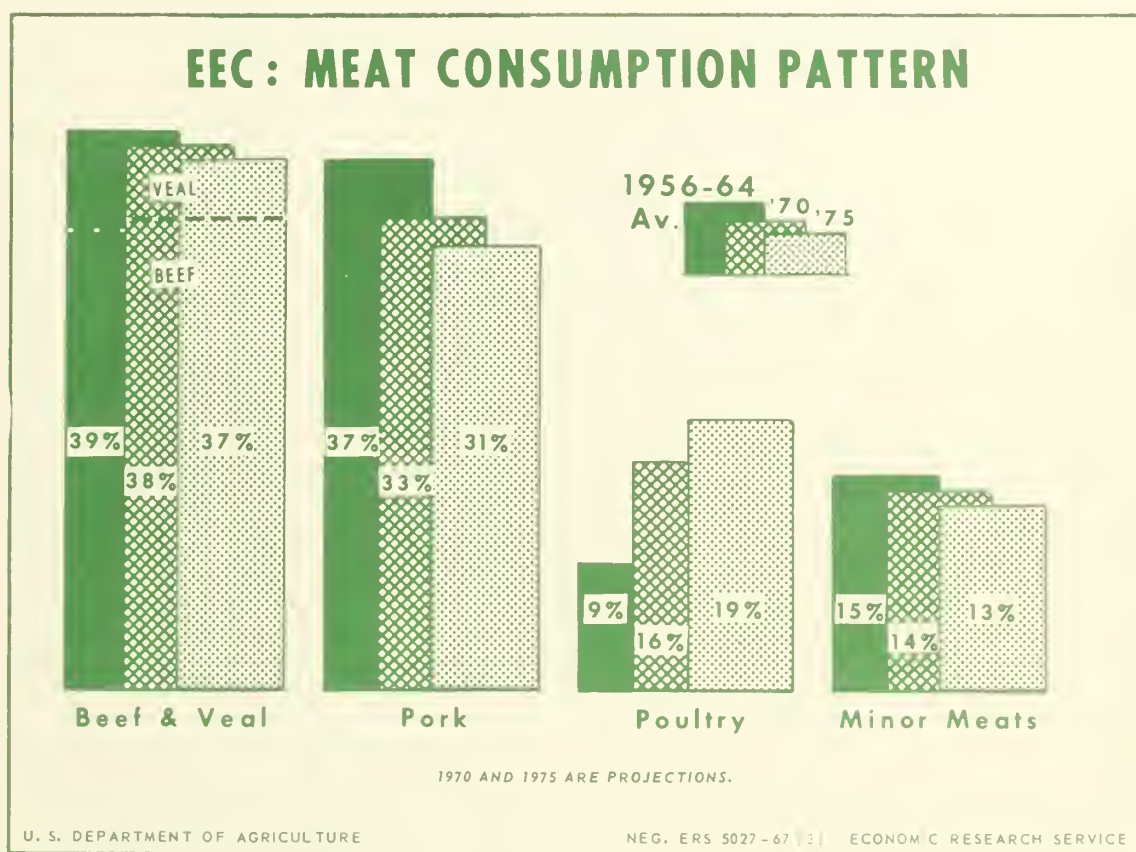
Figure 5

Table 8.--Changing meat consumption patterns, EEC, average 1956-64, 1964, and projected 1970 and 1975

Type of meat	Average 1956-64	1964	1970	1975
	----------------------Percent----------------------			
Beef and veal........	38.8	38.9	37.8	37.4
Beef..............	32.2	33.0	32.6	32.8
Veal..............	6.6	5.9	5.2	4.6
Pork..............	36.9	34.8	32.9	30.8
Poultry............	9.3	12.0	15.6	18.7
Subtotal: Major meats........	85.0	85.7	86.3	86.9
Minor meats[1]........	15.0	14.3	13.7	13.1
Total: All meats[2]...	100.0	100.0	100.0	100.0

[1] Including offal.
[2] Excluding trim fat; including offal.

Source: Appendix table 31.

Table 9.--Meat consumption by type of meat, per capita and total, EEC, average 1956-64, 1964, and projected 1970 and 1975

Type of meat	Per capita				Total			
	Average 1956-64	1964	1970	1975	Average 1956-64	1964	1970	1975
	-----------Kilograms-----------				------Million metric tons--------			
Beef and veal........	20.6	23.7	27.2	31.0	3.6	4.2	5.2	6.2
Beef..............	16.8	20.1	23.4	27.2	3.0	3.6	4.5	5.4
Veal..............	3.8	3.6	3.7	3.8	.6	.6	.7	.8
Pork..............	19.6	21.1	23.7	25.6	3.4	3.8	4.5	5.1
Poultry............	5.0	7.3	11.2	15.5	.8	1.3	2.1	3.1
Subtotal: Major meats........	45.2	52.1	62.1	72.1	7.8	9.3	11.8	14.4
Minor meats[1]........	8.0	8.7	9.8	10.9	1.4	1.6	1.9	2.2
Total: All meats[2]...	53.2	60.8	71.9	83.0	9.2	10.9	13.7	16.6

[1] Including edible offal.
[2] Excluding trim fat; including offal.

Source: Regression equation (1) and tables 7 and 8.

Meat Production

Self-Sufficiency

A complete analysis of the evolution of supply of meat and livestock products lies outside the scope of this study. Yet consideration of supply is basic to an understanding of feed grain utilization and requires either forthright analysis or assumption. The assumption regarding supply can be either tacit or explicit. The form of analysis used in this study requires quantification of future developments in livestock production as it is likely to relate to meat consumption in the EEC.

It was assumed that the EEC would have the same degree of self-sufficiency in production of the individual meat categories in 1970 and 1975 as in 1961/62-1963/64, except that it would become self-sufficient in poultry production (table 10). The framework of analysis is constructed so that the effects of different levels of production or self-sufficiency of individual livestock products on feed grain consumption can be quantified. This procedure permits the use of other assumptions or estimates of self-sufficiency or production and, with the framework presented, the estimation of alternative levels of feed grain consumed.

Over the period 1956 to 1962, the gap between EEC meat consumption and production remained stable, growing only slightly and giving rise to anticipations that EEC meat imports might be eliminated in the near future through advancing domestic production (12 and 24). Largely self-sufficient in pork, the EEC imported mainly beef, poultry, some minor meats, and offal. In 1962 and 1963, however, heavy slaughter of cattle depleted herds and a period of herd rebuilding began.

Beef production, compared with beef consumption in the last 2 years, suggests a larger shortfall than the 90-percent average of 1961-63. However, beef production seems to be picking up, and herds have been increasing for over a year.[4] Europe appears to be emerging from a cyclical low in beef production, and if this judgment is true, should be enjoying relatively high beef production by 1970. By that time, the 90-percent self-sufficiency estimate may ap-

pear low; for 1975 it appears a reasonable assumption.

High meat prices in Europe provided an incentive to increase both beef and pork production. While beef production is recovering, the opportunities for pork production will be good, and a significantly increased pork output is expected, because of the shorter production cycle for hogs and the lower risk to invested capital due to the more rapid turnover. Self-sufficiency for pork near 100 percent seems reasonable for both 1970 and 1975.

Poultry production has been expanding rapidly in the EEC. With high prices prevailing for all meats, and with both beef and pork unable to supply consumption needs without imports, poultry production has grown about 10 percent annually and is accelerating. The short production period and the semimechanization of broiler production present this industry with great opportunities. Growth may well exceed that needed to maintain the self-sufficiency rate of the recent past. Complete self-sufficiency seems all but attained already.

Minor meat is expected to have the same degree of self-sufficiency as in the recent past.

Table 10 shows the assumed self-sufficiency rates, projected consumption levels, and resulting production levels as compared with the 1961/62-63/64 average.

Additional Adjustments

To convert net meat production (calculated from self-sufficient consumption rates) to gross domestic production, the production figures given in chapter II must be adjusted. A trim fat adjustment is necessary since consumption data are on a carcass weight basis net of trim fat, while the production series to which the feeding rates apply includes trim fat. The EEC published production series on both bases for 2 years, 1962 and 1963 (13, 1965 (7): 114). From these data, conversion factors were calculated (table 11), and applied to the projected production in table 9 to give the projected levels of production for 1970 and 1975 on a fat-included basis, as shown in table 13.

The feeding rates in tables 1, 2, and 4 group edible offal with the meat from the same type of animal. However, tables 8, 9,

---

[4] See, for example (1). Various issues, such as No. 192, November 16, 1966, pp. MI/7-8, and S/4.

Table 10.--Meat production, consumption, and self sufficiency, EEC, average 1961/63-63/64 and projected 1970 and 1975

Type of meat	Average 1961/62-63/64			1970				1975			
	Consumption[1]	Self sufficiency[2]	Production[1]	Consumption[1]	Self sufficiency	Production consist. with		Consumption[1]	Self sufficiency	Production consist. with	
						Table 9[1]	Table 4[3]			Table 9[1]	Table 4[3]
	1,000 M. T.	Pct.	1,000 M. T.	Mil. M. T.	Pct.	---Mil. M. T.---		Mil. M. T.	Pct.	Mil. M. T.	
Beef and veal.	3,958	91.0	3,603	5.2	91.0	4.7	5.5	6.2	91.0	5.6	6.6
Beef.........	3,314	90.1	2,985	4.5	90.1	4.1	4.8	5.4	90.1	4.9	5.7
Veal.........	644	96.0	618	.7	96.0	.6	.7	.8	96.0	.7	.9
Pork..........	3,625	99.7	3,615	4.5	99.7	4.5	5.9	5.1	99.7	5.1	6.7
Poultry........	1,141	90.1	1,028	2.1	100.0	2.1	2.1	3.1	100.0	3.1	3.1
Subtotal: Major meats.	8,724	94.5	8,246	11.8	(95.8)	11.3	13.5	14.4	(95.8)	13.8	16.4
Minor meats...	1,483	89.4	1,326	1.9	89.4	1.7	.7	2.2	89.4	2.0	.8
Total meats...	10,207	93.8	9,572	13.7	(94.9)	13.0	14.2	16.6	(95.2)	15.8	17.2

[1] Excluding trim fat; offal included with minor meats. Consistent with definitions underlying table 9.
[2] Computed from data in (13), various issues, especially 1965, (7). Poultry computed at 90.1% self-sufficiency in 1961/62-63/64, but assumed to be 100% in 1970 and 1975.
[3] Including trim fat; offal distributed by type of meat. Consistent with definitions underlying feeding rates in tables 1 and 4 computed using table 11.

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Table 11.--Meat production adjustment factors, carcass weight, EEC, average 1962/63-63/64

Type of meat	Trim fat factor[1]	Offal factor[2]
	-------Percent--------	
Total meat.........	[3] (109.7)	100.0
Beef and veal......	104.6	--
Beef.............	--	111.2
Veal.............	--	115.2
Pork..............	120.7	108.1
Poultry...........	100.0	100.0
Minor meats........	101.1	(Negative residual)

[1] The trim fat adjustment is the percentage by which meat production on a without-fat basis must be increased in order to express the same volume of meat production on a fat-included basis. The meat production figures on both bases (without-fat and fat-included) are from meat supply and distribution tables published in (13), 1965 (7): 114.

[2] The offal adjustment is the percentage by which meat production on a with-fat basis of each of the major meats must be increased in order to express the same volume of meat on an offal-included basis. The minor meat category is diminished accordingly. Adjustments are computed from data in (13), 1965 (7): 64, table IV.

[3] Derived from computations.

and 10 include all edible offal as a part of both minor meats and total meats. Further adjustments, therefore, are necessary to give to the production projections the internal distribution of the offal which conforms to the definition used in establishing the feeding rates.

Here again the EEC has published data permitting the computation of the required conversion factors (13, 1965(7): 64). Table 11 sets forth the computed factors; and table 10, the adjusted meat production projections for 1970 and 1975 consistent with the feeding coefficients of tables 1, 2, and 4.

Production of Milk and Eggs

Milk

In European agriculture, milk and beef are typically produced together by the same farm enterprise--essentially dairy, with dual-purpose cattle. To an extent not yet fully quantified on national or Community scales, however, beef feeding is establishing itself as a specialized enterprise. Similarly, milk production is becoming specialized in a growing number of more intensive, larger scale enterprises.

The joint nature of milk and beef production is causing difficulty in planning EEC agricultural policy. Milk production at prices prevailing in Europe in recent years is greater than consumption. With beef, the situation is reversed; demand exceeds supply at recent prices. Efforts to increase beef output have thus far been accompanied by undesired rises in milk production.

To measure the joint relationship between these two products, milk production was regressed on production of beef and veal, using two formulas. The results are given below:

$$M = 0.636\,B + 32.396 \qquad R^2 = 0.955 \quad (4)$$

$$M = 0.303\,B - 2604\,\frac{1}{B} + 92.376 \qquad R^2 = 0.966 \quad (5)$$
$$(0.219) \quad (1680) \qquad\qquad S^2 = 2.330$$
$$DW = 1.686$$

where--

M = Index of milk production (base 1960: 63.07 million metric tons = 100)

B = Index of beef and veal production, including trim fats and offal (base 1960: 3.69 million metric tons = 100)

Formula (4) is a straight line function. When used for projecting it implies a constant relationship between milk production and beef and veal production. Equation (5), on the other hand, is a line with a slight curve becoming gradually less steep (fig. 7). In fitting the curve, no constraints were imposed on the sign or magnitude of the coefficients. Although the coefficients of B and $\frac{1}{B}$ are not statistically significant in equation (5), this relationship was chosen for projection purposes in

preference to the straight line, because of the changing relationship between beef and veal and milk suggested by the curve. The meaning implied by the curve is that gradually milk output is becoming independent of beef and veal production. This is the desired goal of European policy, and the computed relationship suggests that it may be in process of some degree of realization.

With beef and veal production given, expected milk output can be read from this equation. In the foregoing passages, estimates were made for beef and veal production to reach 5.5 and 6.6 million tons, respectively, in 1970 and 1975. The milk production associated with these levels of beef and veal production is 75.5 million tons in 1970 and 82.8 million tons in 1975 (table 12 and fig. 6 and 7). In comparison

Table 12.--Milk production related to beef and veal production[1] EEC, 1961-63 average, and projected 1970 and 1975

Period	Beef and veal production	Related milk production
	Mil. M. T.	Mil. M. T.
1961-63 average	4.2	65.4
1970............	[2] 5.5	[3] 75.5
1975............	[2] 6.6	[3] 82.8

[1] Including trim fat and offal.
[2] From table 10.
[3] Computed with equation (5), given beef and veal production.

EEC: MILK PRODUCTION
BEEF & VEAL PRODUCTION

BEEF & VEAL   MIL. METRIC TONS   MILK

Beef & Veal
Milk

1961-63 Av.   1970*   1975*

*PROJECTED.
THE SCALE FOR MILK IS TEN TIMES THAT OF BEEF AND VEAL.

U. S. DEPARTMENT OF AGRICULTURE   NEG. ERS S028-67(3)   ECONOMIC RESEARCH SERVICE
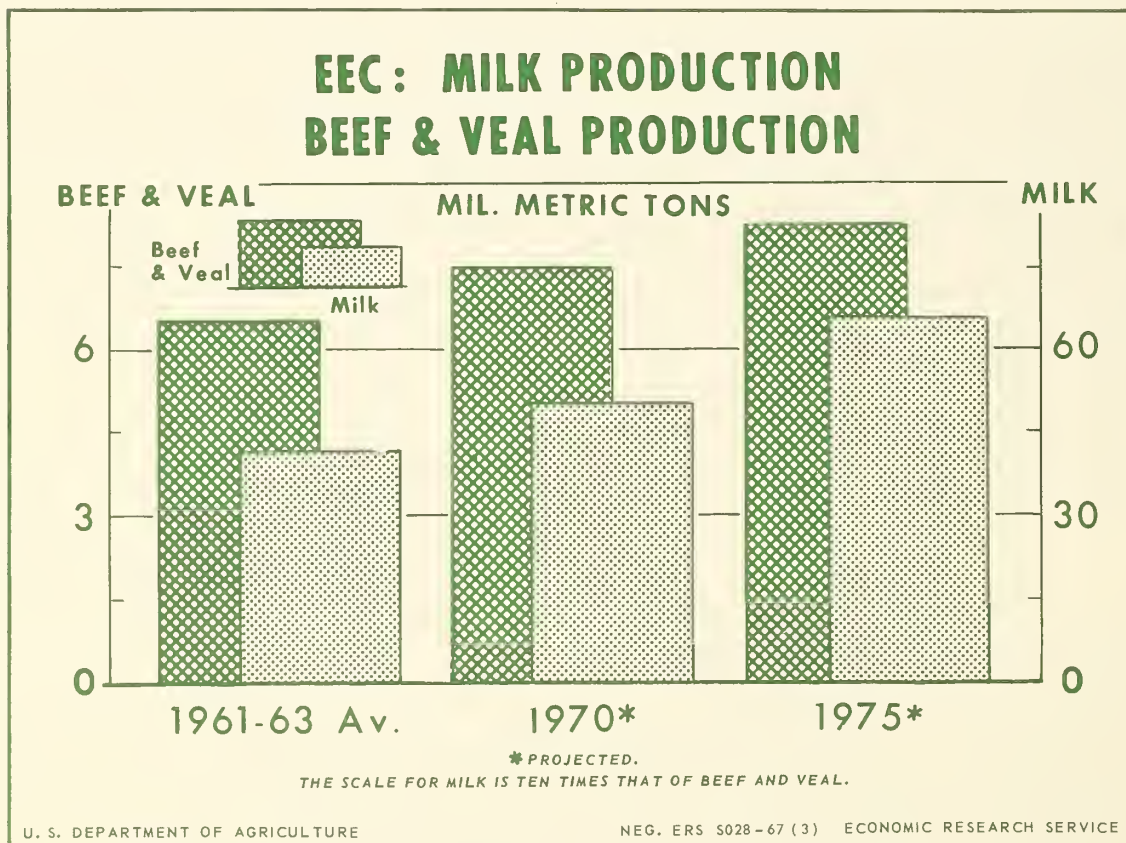
Figure 6

EEC: MILK PRODUCTION IN RELATION TO BEEF AND VEAL PRODUCTION
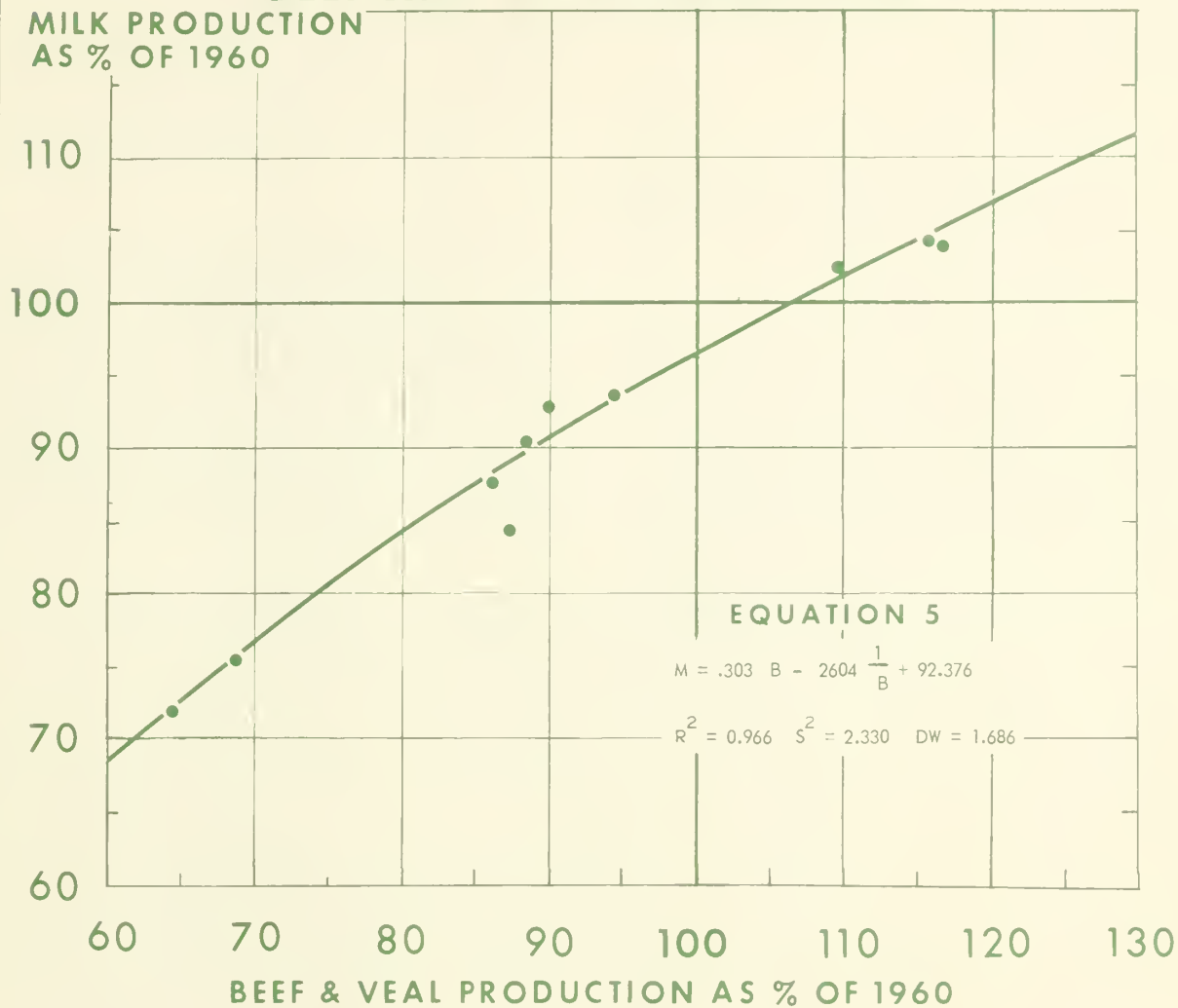
MILK PRODUCTION
AS % OF 1960

EQUATION 5

$$M = .303 \ B - 2604 \ \frac{1}{B} + 92.376$$

$$R^2 = 0.966 \quad S^2 = 2.330 \quad DW = 1.686$$

BEEF & VEAL PRODUCTION AS % OF 1960

Figure 7

with these figures, the straight line rela-
tionship between beef and veal production
and milk output, equation (4), would have
given 80.2 and 92.2 million tons of milk in
1970 and 1975.

Eggs

Egg production in the EEC has been ris-
ing steady. The increase was nearly 50
percent from 1956 to 1964, which repre-

sents an average annual increase of more
than 5 percent. Production in 1964 reached
2.15 million tons.

Comprehensive data on egg consumption
are not available from Community sources.
OECD data, however, indicate that egg
consumption reached 2.0 million tons in
1960 (20, p. 118) or 11.4 kilograms per
capita.

The Community is increasingly supplying
its own egg requirements. While it provided
85 percent of its needs during 1954-62, it

apparently produced 97 percent of its needs in 1962-64.

Per capita egg consumption was projected from the following least squares straight trend line fitted to OECD data covering 1952/53-62/63:

$$H = 2.664 \, T + 75.321 \qquad (6)$$

where--

H = Index of per capita egg consumption (base average 1959/60-60/61, 1960: 11.4 kilograms = 100)

T = Time, 1 in 1952/53

This equation gives 14.2 and 15.7 kilograms of egg consumption per person in 1970 and 1975, which is equivalent to 2.6 and 3.0 million tons of total consumption, respectively, in the projection years.

An assumed per capita expenditure elasticity of 0.35, adjusted to the consumption data in 1960, provided a linear demand estimating equation which gave 2.5 and 2.8 million tons in 1970 and 1975.

$$H = 0.0399 \, E + 7.410 \qquad (7)$$

where--

H is as defined above, equation (6), and E = Index of per capita consumer expenditure (base 1960: $672 equiv. = 100)

Assumed rates of self-sufficiency applied to the egg consumption estimates transform the 1970 and 1975 consumption estimates into production estimates to which projected feeding rates may be applied to obtain grain consumption. Extrapolation of production trends yields figures close to the consumption estimates. Accordingly, it was assumed that the EEC would be 100 percent self-sufficient in eggs in 1970 and 1975 (table 13).

Table 13.--Eggs: Consumption, self-sufficiency, and production, EEC, selected periods and projected 1970 and 1975

Period	Consumption		Self-sufficiency	Production
	Per capita	Total		
	Kg.	Mil. M. T.	Rate	Mil. M. T.
1956-58........	10.3	1.74	89.7	1.56
1959-61........	11.4	1.99	90.9	1.81
1962-64........	[1] 11.8	[1] 2.12	97.2	2.06
1965..........	12.6	2.3	95.7	2.2
1970..........	[2] 14.2	2.6	[3] 100.0	2.6
1975..........	[2] 15.7	3.0	[3] 100.0	3.0

[1] Partly estimated.
[2] Computed with equation (6).
[3] Assumed.

Source: Production, (13) 1966 No. 3 p. 63 for historical data. Averages are 3 calendar years. 1965, 1970, 1975 are projected. Consumption, (20, p. 118) for historical data. Averages are for 2 crop years. 1965, 1970, and 1975 are projected.

Interpretation and Application

The meat production estimates of table 10, the milk and egg production estimates of tables 12 and 13, and the feeding rates of table 4 yield estimates of EEC consumption of grain as feed for livestock (table 14).

If the EEC becomes independent in poultry but maintains the historic degree of self-sufficiency in the basic categories of meat, if the feeding rates involving grain for all livestock products except poultry and eggs continue to change as they appear to have done in the recent past, and if the demand for meat develops as projected (see pp. 15-17), grain feeding for the whole EEC is expected to reach 48.6 million tons in 1970 and 58.4 million tons in 1975 (fig. 8). These figures are 39 and 67 percent over the 1961/62-62/63 average of 34.9 million tons, or 22 and 47 percent higher than the 1965/66 figure of 39.8 million tons. Feed grain consumption was only 19.1 million tons annually during 1950/51-52/53.

In 1970 meat products are expected to account for nearly 32 million tons of grain. Of this, 21 million tons appear destined for pork, over 5 million tons for poultry, and nearly 5 million tons for producing beef. Milk and egg production can be expected to absorb nearly 9 and 8 million tons of grain, respectively.

In 1975 meat production is expected to absorb over 38 million tons of grain. Of this, 25 million tons appear headed for pork, over 8 million for poultry, and almost 6 million for beef. Milk and egg production are likely to account for about 19 million tons of grain.

EEC grain consumption by livestock might be quite different from the figures just given. Self-sufficiency in beef and veal alone would require only an estimated additional 0.4 million tons of grain by 1970 over the requirements of historic self-sufficiency levels. However, the augmented meat output would raise milk production by an estimated 3.4 million tons, and this milk production would require another 0.4 million tons of grain.

In 1975 beef and veal self-sufficiency might require an additional 0.6 million tons of feed to produce the additional meat and an extra 0.5 million tons for the accompanying milk.

Attaining self-sufficiency in poultry appears to involve as much additional grain in both 1970 and 1975 as reaching self-sufficiency in beef and veal (ignoring the related increased milk production).

Finally, if the factors underlying the milk-beef relationship do not continue to evolve toward a gradual separation of beef production from milk production, the linear relationship of equation (4) may be expected to give more accurate projection results than equation (5). Equation (4) results in higher projected feed grain utilization than equation (5) by 0.6 million tons in 1970 and 1.1 million tons in 1975.

The basic projection developed in the course of this study is presented in table 15 as case I. It assumes that the Community becomes independent in poultry but that historic rates of self-sufficiency in other meat production prevail, i.e. those ruling during the period 1961/62-63/64; that the Community is self-sufficient in egg production; that milk production is functionally related to beef and veal output in a way that suggests a growing independence of the two activities; and that the feeding rates continue to evolve so as to employ more grain for a given quantity of livestock product-- except for poultry and eggs whose feeding rates are assumed to be unchanged from 1962. Under these conditions, EEC feed grain consumption in 1970 and 1975 is expected to reach 48.6 and 58.4 million tons.

The achievement of complete self-sufficiency in all meats, with all other conditions as in case I, is tabulated under case II. It results in estimated feed grain consumption of 49.4 and 59.5 million tons in 1970 and 1975.

For comparative purposes and as illustration of some of the capability of the analytical framework presented in this study, cases III and IV have been tabulated as well. Case III conditions call for self-sufficiency in all meats; uniformly changing feeding rates for all livestock products, including poultry and eggs; and a linear relationship between milk production and beef and veal--implying no departure from established practice of producing both meat and milk from multipurpose herds. It may be thought of as the case of maximum feed grain consumption without meat exportation

Table 14.--Estimated production of livestock products, feeding rates, and feed grain use, EEC, average 1961-1963 and projected 1970 and 1975

Product	Average 1961-1963			1970			1975		
	Livestock production	Feeding rates	Grain fed	Livestock production	Feeding rates	Grain fed	Livestock production	Feeding rates	Grain fed
	Mil. M. T.		Mil. M. T.	Mil. M. T.		Mil. M. T.	Mil. M. T.		Mil. M. T.
Total meats........	10.377	(2.077)	21.549	14.2	(2.225)	31.6	17.2	(2.267)	39.0
Beef and veal.....	4.210	(.743)	3.127	5.5	(.836)	4.6	6.6	(.848)	5.6
Beef.............	3.467	.902	3.127	4.8	.956	4.6	5.7	.989	5.6
Veal.............	.743	0	0	.7	0	0	.9	0	0
Pork..............	4.613	3.410	15.730	5.9	3.613	21.3	6.7	3.740	25.1
Poultry...........	.977	2.607	2.547	2.1	2.607	5.5	3.1	2.607	8.1
Subtotal: Major meats.....	9.800	(2.184)	21.404	13.3	(2.323)	30.9	16.1	(2.360)	38.0
Minor meats.......	.577	.251	.145	.7	.266	.2	.8	.275	.2
Other products...	--	--	13.344	--	--	17.0	--	--	19.4
Milk..............	65.407	.111	7.260	75.48	.118	8.9	82.79	.122	10.1
Eggs..............	1.957	3.109	6.084	2.6	3.109	8.1	3.0	3.109	9.3
Total: Meats and meat products..	--	--	¹ 34.893	--	--	48.6	--	--	58.4

¹ Actual grain fed 34.89 million metric tons (13), grain tables, various issues.

EEC: MEAT PRODUCTION AND GRAIN FED TO LIVESTOCK

MIL. METRIC TONS

MEAT / GRAIN

1961-63 Av.   1970°   1975°

OPROJECTED.
GRAIN IS THREE TIMES THAT OF MEAT.

U. S. DEPARTMENT OF AGRICULTURE   NEG. ERS 5030-67 (3)   ECONOMIC RESEARCH SERVICE
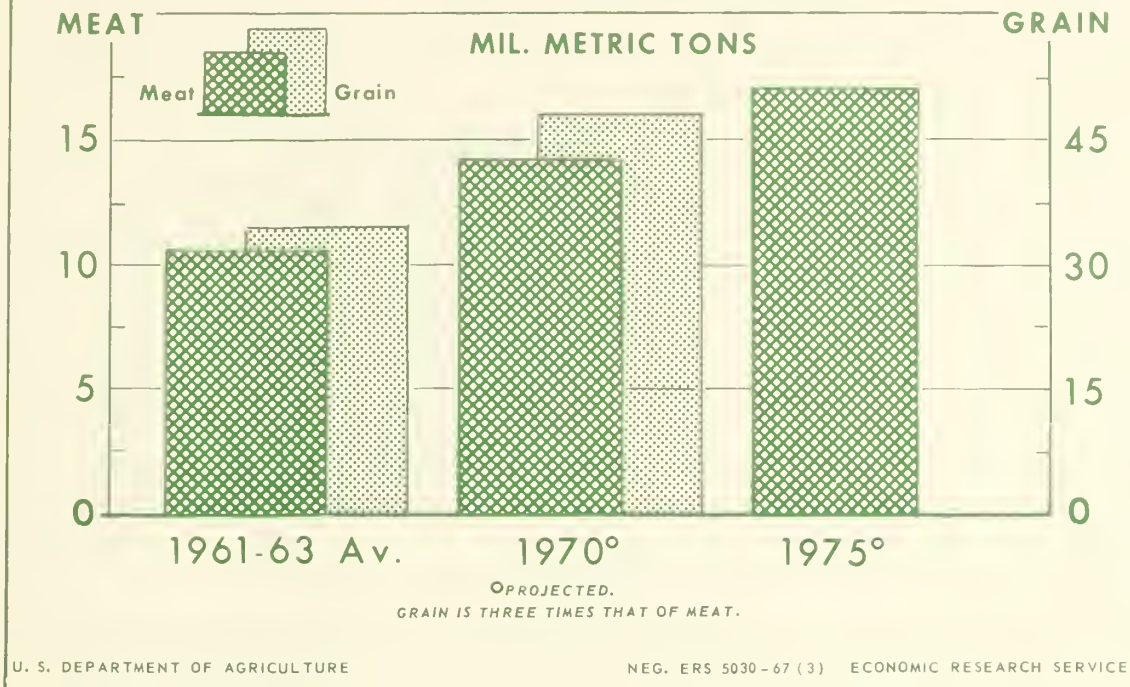
Figure 8

and foresees feed grain consumption of 51.0 and 62.8 million tons in 1970 and 1975.

Case IV assumes the basic conditions of case I except that the quantity of grain fed per unit of livestock output is assumed not to change from 1962 onward. This may be considered as the case of minimum feed grain consumption compatible with a thriving livestock industry, and barring the appearance of important substitutes for grain as livestock feed. It gives rise to estimated feed grain consumption in 1970 and 1975 of 46.1 and 53.9 million tons.

The variation among the 4 cases establishes a range of plausibility for the projections. It also illustrates the sensitivity of the model to conditions of self-sufficiency in livestock production and to changes in the feeding rates. Finally, it suggests how the model may be used as a do-it-yourself kit for enabling other researchers to alter the assumptions incorporated into this presentation and arrive at different projected quantities of feed grain consumed.

Some Implications for Consumption of Grain

The use of grain for livestock feed in the EEC is projected to increase steadily through 1975. This is the major category within total grain consumption. Grain use for other purposes, including human food and industrial uses, has varied little from 29.5 million tons during the past decade, and there are no compelling reasons to suppose that this situation is likely to change between now and 1975. Total grain consumption in the EEC, then, may be expected to increase through 1975 by about the increase in feed grain use.

Table 15.--Estimated EEC feed grain consumption in 1970 and 1975 under varying assumptions as to livestock production, self-sufficiency, and feeding rates

| Type of product | Estimated feed grain consumption | | | | | | | |
| | 1970 | | | | 1975 | | | |
	I	II	III	IV	I	II	III	IV
	-----------------------Million metric tons-----------------------							
Meat.............	31.6	32.0	32.3	29.6	39.0	40.6	41.4	35.4
Beef and veal..	4.6	5.0	5.0	4.3	5.6	6.2	6.2	5.1
Pork...........	21.3	21.3	21.3	20.1	25.1	25.1	25.1	22.8
Poultry........	5.5	5.5	5.8	5.0	8.1	8.1	8.9	7.3
Minor meats....	.2	.2	.2	.2	.2	.2	.2	.2
Milk............	8.9	9.3	10.1	8.4	10.1	10.6	12.2	9.2
Eggs............	8.1	8.1	8.6	8.1	9.3	9.3	10.2	9.3
Livestock production...........	48.6	49.4	51.0	46.1	58.4	59.5	62.8	53.9

Assumptions:
In all cases meat consumption is that projected in chapter III.
Case I: Historic rates of self-sufficiency in meat production except poultry, 100 percent; growing beef-milk specialization; changing feeding rates, except for poultry and eggs.
Case II: 100 percent self-sufficiency in meat production; growing beef-milk specialization; changing feeding rates, except for poultry and eggs.
Case III: 100 percent self-sufficiency in meat production; beef and milk remain joint products; changing feeding rates, including poultry and eggs.
Case IV: Historic rates of self sufficiency in meat production; growing beef-milk specialization; unchanging feeding rates.

Thus the prospects are that total grain consumption will continue a strong rise through 1975. From 66.9 million tons annually in 1962/63-64/65 it may well rise, under case I, to 78.1 million tons in 1970 and to 87.9 million in 1975. The range of total grain consumption provided by cases III and IV are from 75.6 to 80.5 million tons in 1970 and from 83.4 to 93.3 million tons in 1975 (fig. 9).

The prospective growth in EEC grain consumption carries strong implications for the evolution of the balance between production and consumption. The balance itself depends upon both production and consumption. Some of the principal factors in the feed grain component in total grain consumption have been investigated in the foregoing chapters. An analysis of grain production, however, lies beyond the scope of this study. But if it is assumed that production will rise on the arithmetic trend of the years since the mid-1950's, the implication is that the shortfall of EEC grain production with respect to consumption may be expected to widen. The shortfall was 8.9 million tons in 1962/63-64/65, and under case I, it might reach 12 million tons by 1970 and from 11 to 20 million in 1975.

But it is possible that EEC grain production will not remain on trend through 1975. As new agricultural technology spreads and as the EEC achieves a Common Market, grain output might rise above the trend of recent years. If this should happen, the Community's grain deficit would be correspondingly reduced.

EEC: ESTIMATED GRAIN CONSUMPTION

MIL. METRIC TONS

I, III, AND IV: SEE TABLE 15 AND TEXT FOR DEFINITIONS.
1956 - 1965 ARE CROP YEARS ENDING JUNE 30.
1970 AND 1975 ARE CALENDAR PROJECTIONS.

U. S. DEPARTMENT OF AGRICULTURE   NEG. ERS 5031-67 (3)   ECONOMIC RESEARCH SERVICE
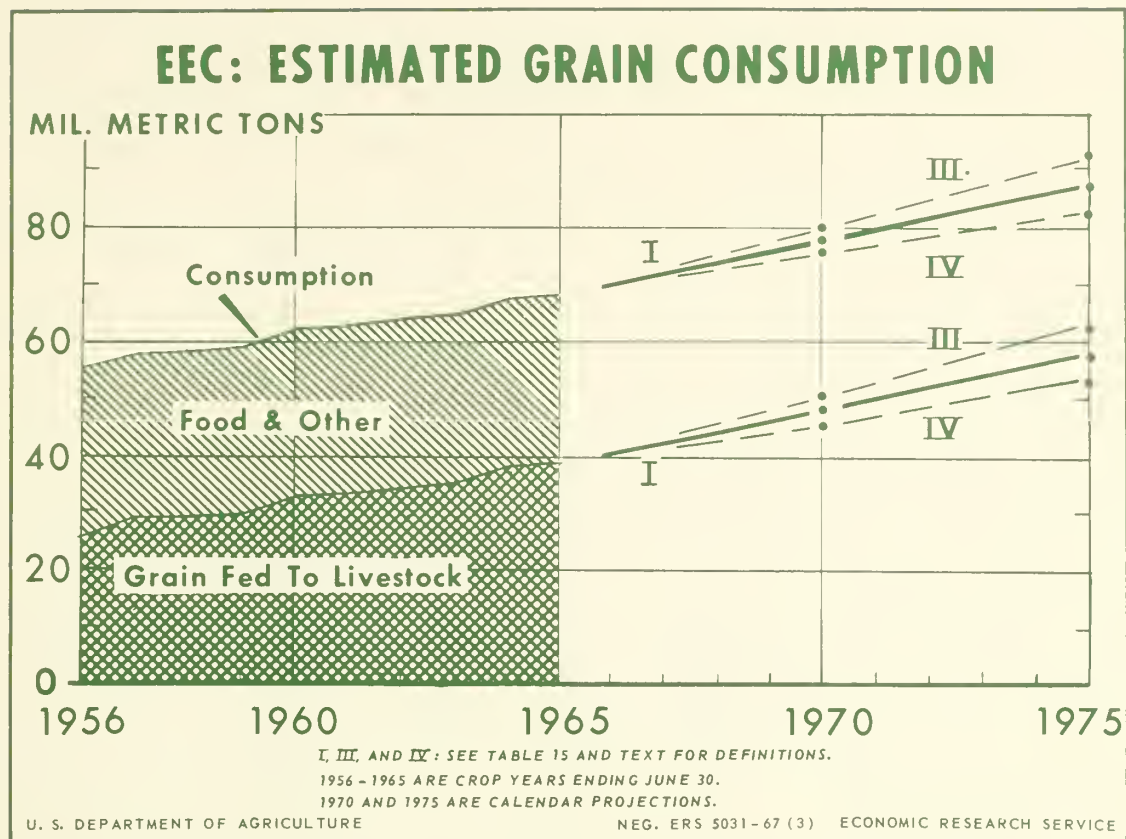
Figure 9

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APPENDIX

Table 16.--Feed grain use: Total and estimated use by type of livestock product--Final rates, EEC, 1950-65

Year	Grain used as feed[1]	Estimated grain use in livestock production[2]						
		Beef	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
		----------------------------Million metric tons----------------------------						
1950.....	--	1.49	8.45	.93	3.40	4.58	.13	18.98
1951.....	17.47	--	--	--	--	--	--	--
1952.....	19.17	1.65	10.48	.99	3.68	4.89	.13	21.82
1953.....	20.77	--	--	--	--	--	--	--
1954.....	22.76	2.17	10.71	1.18	4.15	5.53	.13	23.82
1955.....	23.76	--	--	--	--	--	--	--
1956.....	25.94	2.17	12.80	1.34	4.34	5.85	.12	26.62
1957.....	29.04	2.28	13.39	1.46	4.73	6.10	.12	28.08
1958.....	29.05	2.36	13.53	1.62	4.95	6.16	.13	28.75
1959.....	29.69	2.49	14.00	1.86	5.29	6.42	.13	30.19
1960.....	32.75	2.65	14.81	2.05	5.51	6.87	.14	32.03
1961.....	33.22	2.99	15.06	2.28	5.86	7.12	.14	33.45
1962.....	34.33	3.19	16.20	2.55	6.06	7.29	.15	35.44
1963.....	35.44	3.20	15.94	2.79	6.33	7.37	.14	35.77
1964.....	38.20	--	--	--	--	--	--	--
1965.....	38.68	--	--	--	--	--	--	--

[1] Crop year ending June 30.
[2] Calendar year. Calculated from livestock production figures in table 17 and "final feeding rates" as described in the text. Computed factors for multiplying the "adjusted feeding rates" for 1962 are given below:

Source: Table 23.

Adjustment factors computed from equation $C_n = C_0(1 + .00745 n)$

Year	Factor	Year	Factor
1950.....	.91060	1962..	1.00000
1952.....	.92550	1963..	1.00745
1954.....	.94040	1964..	1.01490
1956.....	.95530	1965..	1.02235
1957.....	.96275	1966..	1.02980
1958.....	.97020		
1959.....	.97765	1970..	1.05960
1960.....	.98510		
1961.....	.99255	1975	1.09685

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Table 17.--Livestock production and calculated grain use by type of livestock
product--first approximation, EEC, 1950-65

Calendar year	Livestock production[1]						
	Beef	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
	----------Million metric tons----------						
1950........	1.82	2.72	.39	1.20	45.35	.55	--
1951........	--	--	--	--	--	--	--
1952........	1.98	3.32	.41	1.28	47.52	.54	--
1953........	--	--	--	--	--	--	--
1954........	2.56	3.34	.48	1.42	53.19	.56	--
1955........	--	--	--	--	--	--	--
1956........	2.52	3.93	.54	1.46	55.20	.51	--
1957........	2.63	4.08	.58	1.58	57.04	.51	--
1958........	2.70	4.09	.64	1.64	57.04	.53	--
1959........	2.82	4.20	.73	1.74	58.93	.55	--
1960........	2.98	4.41	.80	1.80	63.07	.57	--
1961........	3.34	4.45	.88	1.90	64.76	.58	--
1962........	3.54	4.75	.98	1.95	65.66	.58	--
1963........	3.52	4.64	1.07	2.02	65.80	.57	--
1964........	3.25	4.87	1.18	--	--	.62	--
1965........	--	--	--	--	--	--	--
	Estimated grain use in livestock production[2]						
1950........	1.56	9.11	1.01	3.72	4.94	.14	20.48
1951........	--	--	--	--	--	--	--
1952........	1.70	11.12	1.07	3.97	5.18	.14	23.18
1953........	--	--	--	--	--	--	--
1954........	2.20	11.19	1.25	4.40	5.80	.14	24.98
1955........	--	--	--	--	--	--	--
1956........	2.17	13.16	1.40	4.53	6.02	.13	27.41
1957........	2.26	13.67	1.51	4.90	6.22	.13	28.69
1958........	2.32	13.70	1.66	5.08	6.38	.13	29.27
1959........	2.43	14.07	1.90	5.39	6.42	.14	30.35
1960........	2.56	14.77	2.08	5.58	6.87	.14	32.00
1961........	2.87	14.91	2.29	5.89	7.06	.15	33.17
1962........	3.04	15.91	2.55	6.05	7.16	.15	34.86
1963........	3.03	15.54	2.78	6.26	7.17	.14	34.92
1964........	2.79	16.31	3.07	--	--	.16	--
1965........	--	--	--	--	--	--	--

[1] Source: (13), various issues. Supply and distribution tables for livestock products.
[2] Calculated using livestock production (above) and feeding rates from table 1.

Table 18.--Livestock production and calculated grain use by type of livestock
product--first approximation, West Germany, 1950-65

Calendar year	Livestock production[1]						
	190 Beef veal	*273* Pork	*=9* Poultry	*1..* Eggs	*64* Milk	*12..* Minor meats	Total grain
	----------------------------------Million metric tons-------------------------------						
1950........	.53	1.08	.05	.24	13.93	.11	--
1951........	--	--	--	--	--	--	--
1952........	.58	1.47	.06	.30	15.90	.10	--
1953........	--	--	--	--	--	--	--
1954........	.74	1.48	.06	.35	17.16	.10	--
1955........	--	--	--	--	--	--	--
1956........	.73	1.71	.07	.33	17.12	.07	--
1957........	.82	1.82	.08	.37	17.38	.06	--
1958........	.86	1.87	.09	.39	17.98	.06	--
1959........	.87	1.84	.10	.41	18.50	.07	--
1960........	.91	1.92	.10	.45	19.25	.08	--
1961........	.96	2.02	.11	.48	19.87	.07	--
1962........	1.06	2.16	.11	.51	20.30	.07	--
1963........	1.10	2.18	.12	.57	20.70	.07	--
1964........	1.06	2.29	.14	--	--	.07	--
1965........	--	--	--	--	--	--	--

Estimated grain use in livestock production[1]

Calendar year	Beef veal	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
1950........	.11	3.46	.13	.74	.98	.03	5.45
1951........	--	--	--	--	--	--	--
1952........	.12	4.70	.16	.93	1.11	.03	7.05
1953........	--	--	--	--	--	--	--
1954........	.15	4.74	.16	1.08	1.20	.03	7.36
1955........	--	--	--	--	--	--	--
1956........	.15	5.47	.18	1.02	1.20	.02	8.04
1957........	.16	5.82	.21	1.15	1.22	.02	8.58
1958........	.17	5.98	.23	1.21	1.26	.02	8.87
1959........	.17	5.89	.26	1.27	1.30	.02	8.91
1960........	.18	6.14	.26	1.39	1.35	.02	9.34
1961........	.19	6.46	.29	1.49	1.39	.02	9.84
1962........	.21	6.91	.29	1.58	1.42	.02	10.43
1963........	.22	6.98	.31	1.78	1.45	.02	10.76
1964........	.21	7.33	.36	--	--	.02	--
1965........	--	--	--	--	--	--	--

[1] See notes to table 17.

Table 19.--Livestock production and estimated grain use by type of livestock
product--first approximation, France, 1950-65

Calendar year	Livestock production[1]						
	Beef	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
	----------------------------Million metric tons----------------------------						
1950--------	.80	.89	.25	.43	15.45	.28	--
1951........	--	---	--	--	--	--	--
1952........	.85	.95	.25	.40	15.45	.29	--
1953........	--	--	--	--	--	--	--
1954........	1.12	1.01	.29	.40	18.54	.29	--
1955........	--	--	--	--	--	--	--
1956........	1.07	1.21	.32	.40	19.60	.29	--
1957........	1.07	1.23	.33	.43	20.66	.32	--
1958........	1.04	1.23	.35	.45	21.12	.32	--
1959........	1.12	1.35	.37	.49	20.30	.32	--
1960........	1.23	1.30	.39	.49	22.97	.36	--
1961........	1.37	1.31	.42	.52	23.79	.36	--
1962........	1.41	1.44	.46	.53	24.31	.36	--
1963........	1.38	1.36	.50	.54	25.34	.37	--
1964........	1.32	1.35	.55	--	--	.42	--
1965........	--	--	--	--	--	--	--
	Estimated grain use in livestock production[1]						
1950........	.80	3.03	.65	1.38	1.55	.07	7.48
1951........	--	--	--	--	--	--	--
1952........	.85	3.23	.65	1.28	1.55	.07	7.63
1953........	--	--	--	--	--	--	--
1954........	1.12	3.43	.75	1.28	1.85	.07	8.50
1955........	--	--	--	--	--	--	--
1956........	1.07	4.11	.83	1.28	1.96	.07	9.32
1957........	1.07	4.18	.86	1.38	2.07	.08	9.64
1958........	1.04	4.18	.91	1.44	2.11	.08	9.76
1959........	1.12	4.59	.96	1.57	2.03	.08	10.35
1960........	1.23	4.42	1.01	1.57	2.30	.09	10.62
1961........	1.37	4.45	1.09	1.66	2.38	.09	11.04
1962........	1.41	4.90	1.20	1.70	2.43	.09	11.73
1963........	1.38	4.62	1.30	1.73	2.53	.09	11.65
1964........	1.32	4.59	1.43	--	--	.11	--
1965........	--	--	--	--	--	--	--

[1] See notes to table 17.

Table 20.--Livestock production and calculated grain use by type of livestock
product--first approximation Italy, 1950-65

Calendar year	Livestock production[1]						
	Beef	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
	Million metric tons						
1950........	.24	.29	.06	.29	6.9	.11	--
1951........	--	--	--	--	--	--	--
1952........	.24	.38	.06	.30	7.1	.12	--
1953........	.--	--	--	--	--	--	--
1954........	.35	.30	.07	.32	7.8	.21	--
1955........	--	--	--	--	--	--	--
1956........	.37	.39	.07	.34	8.7	.12	--
1957........	.37	.39	.09	.34	9.1	.08	--
1958........	.40	.37	.12	.35	9.3	.09	--
1959........	.44	.39	.13	.34	9.8	.10	--
1960........	.42	.45	.17	.36	9.9	.11	--
1961........	.59	.42	.20	.37	10.0	.11	--
1962........	.62	.41	.23	.38	9.6	.10	--
1963........	.51	.39	.26	.42	8.6	.10	--
1964........	.48	.48	.27	--	--	.10	--
1965........	--	--	--	--	--	--	--
	Estimated grain use in livestock production[1]						
1950........	.53	1.16	.16	.93	1.38	.03	4.19
1951........	--	--	--	--	--	--	--
1952........	.53	1.52	.16	.96	1.42	.03	4.62
1953........	--	--	--	--	--	--	--
1954........	.77	1.20	.19	1.02	1.56	.05	4.79
1955........	--	--	--	--	--	--	--
1956........	.81	1.56	.19	1.09	1.74	.03	5.42
1957........	.81	1.56	.24	1.09	1.82	.02	5.54
1958........	.88	1.48	.32	1.12	1.86	.02	5.68
1959........	.97	1.56	.35	1.09	1.96	.03	5.96
1960........	.92	1.80	.46	1.15	1.98	.03	6.34
1961........	1.30	1.68	.54	1.18	2.00	.03	6.73
1962........	1.36	1.64	.62	1.22	1.92	.03	6.79
1963........	1.12	1.56	.70	1.34	1.72	.03	6.47
1964........	1.06	1.92	.73	--	---	.03	--
1965........	--	--	--	--	--	--	--

[1] See notes to Table 17.

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Table 21.--Livestock production and calculated grain use by type of livestock
product--first approximation the Netherlands, 1950-65

Calendar year	Livestock production[1]						
	Beef	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
	----------------------------Million metric tons----------------------------						
1950........	.12	.25	.01	.13	5.8	.02	--
1951........	--	--	--	--	--	--	--
1952........	.16	.27	.01	.16	5.6	.02	--
1953........	--	--	--	--	--	--	--
1954........	.17	.31	.02	.23	5.9	.02	--
1955........	--	--	--	--	--	--	--
1956........	.17	.36	.04	.27	5.9	.02	--
1957........	.18	.38	.04	.29	6.0	.02	--
1958........	.18	.37	.05	.30	6.2	.02	--
1959........	.19	.37	.06	.34	6.4	.02	--
1960........	.21	.47	.07	.34	6.8	.02	--
1961........	.21	.42	.08	.35	7.0	.02	--
1962........	.24	.44	.09	.36	7.3	.02	--
1963........	.28	.45	.10	.32	7.0	.02	--
1964........	.19	.48	.12	--	--	.02	--
1965........	--	--	--	--	--	--	--
	Estimated grain use in livestock production[1]						
1950........	.06	.80	.03	.39	.70	.005	1.98
1951........	--	--	--	--	--	--	--
1952........	.08	.86	.03	.48	.67	.005	2.12
1953........	--	--	--	--	--	--	--
1954........	.09	.99	.05	.69	.71	.005	2.53
1955........	--	--	--	--	--	--	--
1956........	.09	1.15	.10	.81	.71	.005	2.86
1957........	.09	1.22	.10	.87	.72	.005	3.00
1958........	.09	1.18	.13	.90	.74	.005	3.04
1959........	.10	1.18	.16	1.02	.77	.005	3.23
1960........	.11	1.50	.18	1.02	.82	.005	3.63
1961........	.11	1.34	.21	1.05	.84	.005	3.55
1962........	.12	1.41	.23	1.08	.88	.005	3.72
1963........	.14	1.44	.26	.96	.84	.005	3.64
1964........	.10	1.54	.31	--	--	--	--
1965........	--	--	--	--	--	--	--

[1] See notes to Table 17.

Table 22.--Livestock production and calculated grain use by type of livestock
product--first approximation, Belgium-Luxembourg, 1950-65

Calendar year	Livestock production[1]						
	Beef	Pork	Poultry	Eggs	Milk	Minor meats	Total grain
	-----------------------------Million metric tons-----------------------------						
1950.......	.13	.22	.03	.12	3.34	.03	--
1951.......	--	--	--	--	--	--	--
1952.......	.16	.24	.03	.11	3.46	.03	--
1953.......	--	--	--	--	--	--	--
1954.......	.18	.24	.03	.13	3.83	.03	--
1955.......	--	--	--	--	--	--	--
1956.......	.18	.27	.04	.13	3.86	.02	--
1957.......	.19	.27	.04	.14	3.91	.02	--
1958.......	.21	.25	.04	.15	3.93	.03	--
1959.......	.21	.26	.05	.16	3.94	.03	--
1960.......	.21	.28	.06	.16	4.10	.02	--
1961.......	.21	.28	.07	.18	4.11	.02	--
1962.......	.22	.30	.08	.17	4.20	.02	--
1963.......	.25	.27	.08	.17	4.17	.02	--
1964.......	.19	.27	.09	--	--	.02	--
1965.......	--	--	--	--	--	--	--
	Estimated grain use in livestock production[1]						
1950.......	.08	.73	.08	.36	.33	.008	1.58
1951.......	--	--	--	--	--	--	--
1952.......	.10	.79	.08	.33	.35	.008	1.65
1953.......	--	--	--	--	--	--	--
1954.......	.11	.79	.08	.39	.38	.008	1.75
1955.......	--	--	--	--	--	--	--
1956.......	.11	.89	.10	.39	.39	.005	1.88
1957.......	.11	.89	.10	.42	.39	.005	1.91
1958.......	.13	.83	.10	.45	.39	.008	1.90
1959.......	.13	.86	.13	.48	.39	.008	1.99
1960.......	.13	.92	.16	.48	.41	.005	2.10
1961.......	.13	.92	.18	.54	.41	.005	2.18
1962.......	.13	.99	.21	.51	.42	.005	2.26
1963.......	.15	.89	.21	.51	.42	.005	2.18
1964.......	.11	.89	.23	--	--	.005	--
1965.......	--	--	--	--	--	--	--

[1] See notes to Table 17.

Table 23.--Grain fed to livestock in the EEC: Derivation of extended series and comparison with first approximation estimates, 1950-65

Year ending June 30	Derivation of extended series						Estimated with feeding rates
	I		II		I extended		Table: 18-22 Sum --Mil. M. T.---
	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	Mil. M.T.	Index (1960)	
1950.....	--	--	--	--	--	--	20.68
1951.....	--	--	17.50	53.35	17.47	53.35	21.88
1952.....	--	--	19.20	58.53	19.17	58.53	23.07
1953.....	--	--	20.80	63.41	20.77	63.41	24.00
1954.....	--	--	22.80	69.51	22.76	69.51	24.93
1955.....	--	--	23.80	72.56	23.76	72.56	26.23
1956.....	25.94	79.21	26.00	79.27	25.94	79.21	27.52
1957.....	29.04	88.67	29.80	90.85	29.04	88.67	28.67
1958.....	29.05	88.70	29.40	89.63	29.05	88.70	29.25
1959.....	29.69	90.66	30.00	91.46	29.69	90.66	30.44
1960.....	32.75	100.00	32.80	100.00	32.75	100.00	32.03
1961.....	33.22	101.44	33.30	101.52	33.22	101.44	33.34
1962.....	34.33	104.82	34.70	105.79	34.33	104.82	34.93
1963.....	35.44	108.21	--	--	35.44	108.21	34.70
1964.....	38.20	116.64	--	--	38.20	116.69	--
1965.....	38.68	118.11	--	--	38.68	118.11	--

Source:
I (13), various issues. Supply and distribution tables for grains.
II (2, p. 28.)

Table 24.--Grain fed to livestock in West Germany: Derivation of extended series and comparison with first approximation estimates, 1950-65

Year ending June 30	Derivation of extended series						Estimated with feeding rates
	I		II		I Extended		Table: 18 ---Mil. M. T.---
	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	
1950......	--	--	--	--	--	--	5.45
1951......	--	--	6.40	64.65	6.35	64.65	--
1952......	--	--	6.60	66.67	6.55	66.67	7.05
1953......	--	--	7.80	78.79	7.74	78.79	--
1954......	--	--	7.60	76.77	7.54	76.77	7.36
1955......	--	--	8.40	84.85	8.33	84.85	--
1956......	8.17	83.20	8.60	86.87	8.17	83.20	8.04
1957......	8.83	89.92	9.10	91.92	8.83	89.92	8.58
1958......	9.08	92.46	9.40	94.95	9.08	92.46	8.87
1959......	8.81	89.71	9.00	90.91	8.81	89.71	8.91
1960......	9.82	100.00	9.90	100.00	9.82	100.00	9.34
1961......	9.55	97.25	9.70	97.98	9.55	97.25	9.84
1962......	10.26	104.48	10.90	110.10	10.26	104.48	10.48
1963......	10.37	105.60	--	--	10.37	105.60	10.76
1964......	10.63	108.25	--	--	10.63	108.25	--
1965......	11.49	117.01	--	--	11.49	117.01	--

Source: Table 23.

Table 25.--Grain fed to livestock in France: Derivation of extended series and comparison with first approximation estimates, 1950-65

Year ending June 30	Derivation of extended series						Estimated with feeding rates
	I		II		I Extended		Table: 19 --Mil. M. T.---
	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	
1950......	--	--	--	--	--	--	7.48
1951......	--	--	6.00	53.57	5.99	53.57	--
1952......	--	--	6.50	58.04	6.49	58.04	7.63
1953......	--	--	6.80	60.71	6.79	60.71	--
1954......	--	--	7.40	66.07	7.39	66.07	8.50
1955......	--	--	7.60	67.86	7.59	67.86	--
1956......	9.43	84.35	8.80	78.57	9.43	84.35	9.32
1957......	10.53	94.19	11.10	99.11	10.53	94.19	9.64
1958......	9.92	88.73	9.70	86.61	9.92	88.73	9.76
1959......	10.19	91.14	10.10	90.18	10.19	91.14	10.35
1960......	11.18	100.00	11.20	100.00	11.18	100.00	10.62
1961......	11.14	99.64	11.20	100.00	11.14	99.64	11.04
1962......	11.47	102.59	10.50	93.75	11.47	102.59	11.73
1963......	11.99	107.25	--	--	11.99	107.25	11.65
1964......	12.88	115.21	--	--	12.88	115.21	--
1965......	12.97	116.01	--	--	12.97	116.01	--

Source: Table 23.

Table 26.--Grain fed to livestock in Italy: Derivation of extended series and comparison with first approximation estimates, 1950-65

Year ending June 30	Derivation of extended series						Estimated with feeding rates
	I		II		I Extended		Table: 20 --Mil. M. T.---
	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	
1950......	--	--	--	--	--	--	4.19
1951......	--	--	2.30	39.66	2.30	39.66	--
1952......	--	--	2.70	46.55	2.70	46.55	4.62
1953......	--	--	2.70	46.55	2.70	46.55	--
1954......	--	--	3.60	62.07	3.60	62.07	4.79
1955......	--	--	3.20	55.17	3.20	55.17	--
1956......	3.68	63.45	3.80	65.52	3.68	63.45	5.42
1957......	4.16	71.72	4.10	70.69	4.16	71.72	5.54
1958......	4.65	80.17	4.90	84.48	4.65	80.17	5.68
1959......	5.05	87.07	5.10	87.93	5.05	87.07	5.96
1960......	5.80	100.00	5.80	100.00	5.80	100.00	6.34
1961......	6.23	107.41	6.20	106.90	6.23	107.41	6.73
1962......	6.56	113.10	7.10	122.41	6.56	113.10	6.79
1963......	7.31	126.03	--	--	7.31	126.03	6.47
1964......	8.89	153.28	--	--	8.89	153.28	--
1965......	8.37	144.31	--	--	8.37	144.31	--

Source: Table 23.

Table 27.--Grain fed to livestock in the Netherlands: Derivation of extended series
and comparison with first approximation estimates, 1950-65

| Year ending June 30 | Derivation of extended series | | | | | | Estimated with feeding rates |
| | I | | II | | I extended | | Table 21 -- Mil. M. T. -- |
	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	
1950......	--	--	--	--	--	--	1.98
1951......	--	--	1.50	41.67	1.51	41.67	--
1952......	--	--	1.80	50.00	1.81	50.00	2.12
1953......	--	--	1.80	50.00	1.81	50.00	--
1954......	--	--	2.20	61.11	2.21	61.11	2.53
1955......	--	--	2.80	77.78	2.77	76.52	--
1956......	2.77	76.52	2.80	77.78	2.77	76.52	2.86
1957......	3.30	91.16	3.30	91.67	3.30	91.16	3.00
1958......	3.15	87.02	3.20	88.89	3.15	87.02	3.04
1959......	3.41	94.20	3.40	94.41	3.41	94.20	3.23
1960......	3.62	100.00	3.60	100.00	3.62	100.00	3.63
1961......	4.12	113.81	4.10	113.89	4.12	113.81	3.55
1962......	3.81	105.25	4.00	111.11	3.81	105.25	3.72
1963......	3.66	101.10	--	--	3.66	101.10	3.64
1964......	3.81	105.25	--	--	3.81	105.25	--
1965......	3.70	102.21	--	--	3.70	102.21	--

Source: Table 23.

Table 28.--Grain fed to livestock in Belgium-Luxembourg: Derivation of extended series
and comparison with first approximation estimates, 1950-65

| Year ending June 30 | Derivation of extended series | | | | | | Estimated with feeding rates |
| | I | | II | | I Extended | | Table: 22 --Mil. M. T.--- |
	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	Mil. M. T.	Index (1960)	
1950......	--	--	--	--	--	--	1.58
1951......	--	--	1.40	60.87	1.42	60.87	--
1952......	--	--	1.50	65.22	1.52	65.22	1.65
1953......	--	--	1.70	73.91	1.72	73.91	--
1954......	--	--	2.00	86.96	2.03	86.96	1.75
1955......	--	--	1.80	78.26	1.82	78.26	--
1956......	1.89	81.12	2.00	86.96	1.89	81.12	1.88
1957......	2.22	95.28	2.20	95.65	2.22	95.28	1.91
1958......	2.25	96.57	2.20	95.65	2.25	96.57	1.90
1959......	2.23	95.71	2.20	95.65	2.23	95.71	1.99
1960......	2.33	100.00	2.30	100.00	2.33	100.00	2.10
1961......	2.18	93.56	2.10	91.30	2.18	93.56	2.18
1962........	2.19	93.99	2.20	95.65	2.19	93.99	2.26
1963......	2.12	90.99	--	--	2.12	90.99	2.18
1964......	1.99	85.41	--	--	1.99	85.41	--
1965......	2.16	92.70	--	--	2.16	92.70	--

Source: Table 23.

Table 29.--Population and consumer expenditure and prices, EEC, 1950-65 and projections for 1970 and 1975

| Year | Real consumer expenditure[1] | | | | Population[2] | | Consumer prices[3] |
| | Total | | Per capita | | | | |
	Mil. Dols.	Index	Dollar	Index	Thousands	Index	Index
1950.	--	--	--	--	--	--	--
1951.	72,230	62.6	454	67.6	159,052	92.6	80.9
1952.	76,040	65.9	475	70.7	160,111	93.2	84.6
1953.	82,040	71.1	508	75.6	161,272	93.9	84.0
1954.	85,730	74.3	528	78.5	162,573	94.7	84.6
1955.	91,500	79.3	558	83.1	163,942	95.5	86.0
1956.	97,960	84.9	593	88.2	165,440	96.3	88.1
1957.	103,730	89.9	621	92.4	167,037	97.6	90.1
1958.	105,000	91.0	623	92.7	168,672	98.3	95.5
1959.	109,040	94.5	640	95.3	170,236	99.1	97.9
1960.	115,390	100.0	672	100.0	171,712	100.0	100.0
1961.	122,420	106.1	706	105.0	173,380	101.0	102.8
1962.	130,040	112.7	741	110.3	175,474	102.2	106.5
1963.	136,610	118.4	769	114.5	177,550	103.4	111.2
1964.	142,610	123.6	796	118.4	179,463	104.4	115.7
1965.	148,270	128.5	818	121.8	181,550	105.5	116.0
1970.	183,570	159.1	963	143.3	190,600	111.0	127.3
1975.	226,960	196.7	1,133	168.6	200,390	116.7	140.2

[1] Computed from individual country series as published in (24), Table 20, p. 25, based on national accounts data from OECD, Main Economic Indicators (Paris), various issues, and OECD, General Statistics (Paris), various issues, using consumer price data from the same sources, population data from EEC, Bulletin General de Statistiques, 1966 No. 2, p. 14 and the following exchange rates:

W. Germany	4.00	Deutsche Marks	= $1.00
France	4.937	New Francs	= $1.00
Italy	625.00	Lire	= $1.00
Bel.-Lux.	50.00	Belgian Francs	= $1.00
Netherlands	3.62	Guilders	= $1.00

The figures include West Berlin and the Saar. Figures for the years 1963 and following are estimated from current evaluations of (11).

[2] Source: (9), 1966, No. 2, p. 14, including West Berlin and the Saar.

[3] Source: (22, 23), various issues. Computed from individual country series using weights proportional to consumer expenditure in 1960 dollars derived from (10).

Table 30.--Meat consumption, grain fed to livestock, and prices of livestock and
grain, EEC, 1950-65 and projections for 1970 and 1975

Year	Meat consumption[1]				Grain fed to livestock[2]		Livestock price[3]		Grain price[3]	
	Total		Per capita				Deflated[4]	Undef.	Deflated[4]	Undef.
	Th. M. T.	Index	Kg.	Index	Mil. M. T.	Index	Index	Index	Index	Index
1951..	5,808	64.3	36.53	69.4	17.47	53.4	110.3	89.2	116.6	94.3
1952..	6,245	69.1	39.00	74.1	19.17	58.5	107.2	90.7	121.7	103.0
1953..	6,693	74.1	41.53	78.9	20.77	63.4	100.2	84.2	121.1	101.7
1954..	7,008	77.6	43.10	81.9	22.76	69.5	107.0	90.5	110.4	93.4
1955..	7,352	81.4	44.95	85.4	23.76	72.6	103.3	88.8	114.2	98.2
1956..	7,742	85.7	46.84	89.0	25.94	79.2	104.5	92.1	113.3	99.8
1957..	8,007	88.6	47.95	91.1	29.04	88.8	105.3	94.9	106.3	95.8
1958..	8,194	90.7	48.63	92.4	29.05	88.7	101.5	96.9	101.8	97.2
1959..	8,595	95.2	50.52	96.0	29.69	90.7	100.7	98.6	102.2	100.1
1960..	9,035	100.0	52.63	100.0	32.75	100.0	99.9	99.9	99.0	99.0
1961..	9,525	105.4	54.95	104.4	33.22	101.4	98.7	101.5	98.2	100.9
1962[r].	10,135	112.2	57.20	108.7	34.33	104.8	95.6	101.8	99.3	105.8
1963[r].	10,385	114.9	59.20	112.5	35.44	108.2	101.1	112.4	96.8	107.6
1964[p].	10,800	119.5	60.26	114.5	38.20	116.7	104.6	121.0	92.8	107.4
1965[p].	11,100	122.9	61.30	116.4	38.68	118.1	105.9	122.9	96.7	112.2
1970[f].	13,700	151.6	71.9	136.6	48.6	148.4	95.0	119.0	88.3	112.2
1975[f].	16,600	183.7	83.0	157.7	58.5	178.6	95.0	--	88.3	--

[1] Figures for total meat consumption are from (24), table 7, p. 19. Indexes and per
capita series are derived from this. Projections are made with equation (1) in text.
[2] Figures are for crop years ending June 30. Source: (13). Grain supply and distribution
tables, various issues, 1955/56 to date. Earlier years are obtained by extending the EEC
series backwards on the basis of indexed data obtained from (2, 3, p. 58-61). Projections
are based on the methodology in the text.
[3] Prices of livestock and of feed grains are prices received by farmers. Figures are
from (24), table 12, p. 21. Projections were made for each commodity in each EEC country
and averaged for the EEC by using production for the average of 1959-1961.
[4] Deflating is by the index of consumer prices.
   [r] Revised
   [p] Preliminary
   [f] Forecast

Table 31.--Meat consumption per capita by type of meat, EEC, 1950-65, 1956-64 average, and projections for 1970 and 1975

Year ending June 30	T	Total Meat[1]	Beef[2]	Veal[2]	Pork[2]	Poultry[2]	Beef and veal[3]	Major meats[3]	Minor meats[3]
		- - - - - - - - - - - - - - - - - Percent - - - - - - - - - - - - - - - - - - -
1956.......	1	100.0	32.2	7.4	37.7	7.0	39.7	84.3	15.7
1957.......	2	100.0	32.4	7.2	37.9	7.4	39.6	84.8	15.2
1958.......	3	100.0	32.2	6.6	38.4	7.8	38.8	85.0	15.0
1959.......	4	100.0	31.8	6.5	37.9	8.7	38.3	84.8	15.2
1960.......	5	100.0	31.7	6.4	37.3	9.5	38.1	84.9	15.1
1961.......	6	100.0	31.7	6.5	36.7	10.1	38.2	84.9	15.1
1962.......	7	100.0	31.7	6.4	36.2	10.9	38.1	85.2	14.8
1963.......	8	100.0	32.6	6.6	35.5	10.7	39.1	85.3	14.7
1964.......	9	100.0	33.0	5.9	34.8	12.0	38.9	85.7	14.3
Ave. 56-64.	--	100.0	32.1	6.6	36.9	9.3	38.8	85.0	15.0
1970.......	15	100.0	32.6	5.2	32.9	15.6	37.7	86.3	13.7
1975.......	20	100.0	32.8	4.6	30.8	18.7	37.2	86.9	13.1

[1] Excluding trim fat; including offal.
[2] Excluding both trim fat and offal.
[3] Excluding trim fat; including offal.

Source: Average 1955/56 - 1963/64 computed from supply and distribution tables for meat in (13), various issues, especially 1963 No. 1 and 1965 No. 7.

Note: The least squares trend equations for estimating per capita consumption of specified types of meat, as percentages of total meat consumption, are given below, where T = "time": = "1" in 1956:

Beef and veal	B&V	$= -.1033\,T + 39.2722$
Beef	B	$= .0450\,T + 31.9195$
Veal	V	$= -.1367\,T + 7.2944$
Pork	Pk	$= -.4067\,T + 38.9667$
Poultry	Py	$= .6250\,T + 6.2194$
Major meats (specified above)	Maj	$= .1267\,T + 84.3556$
Minor meats (All other)	Min	$= -.1267\,T + 15.6444$